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Wood Preparing Equipment

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MORE than 6,000,000 cords of wood were used during the year 1920 in the United States in the production of wood pulp for paper manufacture. A large portion of this enormous quantity of raw material reaches the pulp mill in the form of logs, the length of which may vary from approximately four to sixteen feet. In some instances the length of logs may be less or even more depending upon conditions existing in any individual plant.

The wood may be brought to the mill by rail, boat, or any type of vehicular conveyance, depending upon mill location and conditions governing purchase together with local transportation facilities. It is common practice, however, wherever possible, to drive or transport 12 to 16-foot logs down streams or raft them into large booms and tow them over larger bodies of water to the mill. Such methods of water transportation are economical from the standpoint of actual cost and also aid to a certain extent in putting the wood in good condition for easy pulping. Wood in such a form, however, would scarcely meet the physical requirements of the pulping operation, and must, therefore, be reduced in size so as to be easily handled in the mill operations. It must also be freed from its bark before pulping because the bark would likely form dirt specks in the finished pulp.

Since wood preparation is fundamental in the manufacture of pulp, it seems that a careful study of wood preparing equipment would aid in understanding the vital importance of this phase of pulp mill work and possibly show how much stress should actually be laid upon it.

Log Slashing Equipment

In order that the wood may be easily handled in the succeeding operations, equipment has been designed to deliver the logs from the water to an arrangement of saws which cuts them into a short uniform length.

The equipment used to deliver the logs from the river or pond is commonly designated as a log haul-up and may be one of two types—the parallel chain or the single chain.

The parallel chain haul-up carries the logs sideways or parallel to one another into the mill for cutting, whereas the single chain haul-up conveys the logs from the river end to end. The accompanying illustrations show typical installations of both parallel and single chain haul-ups.

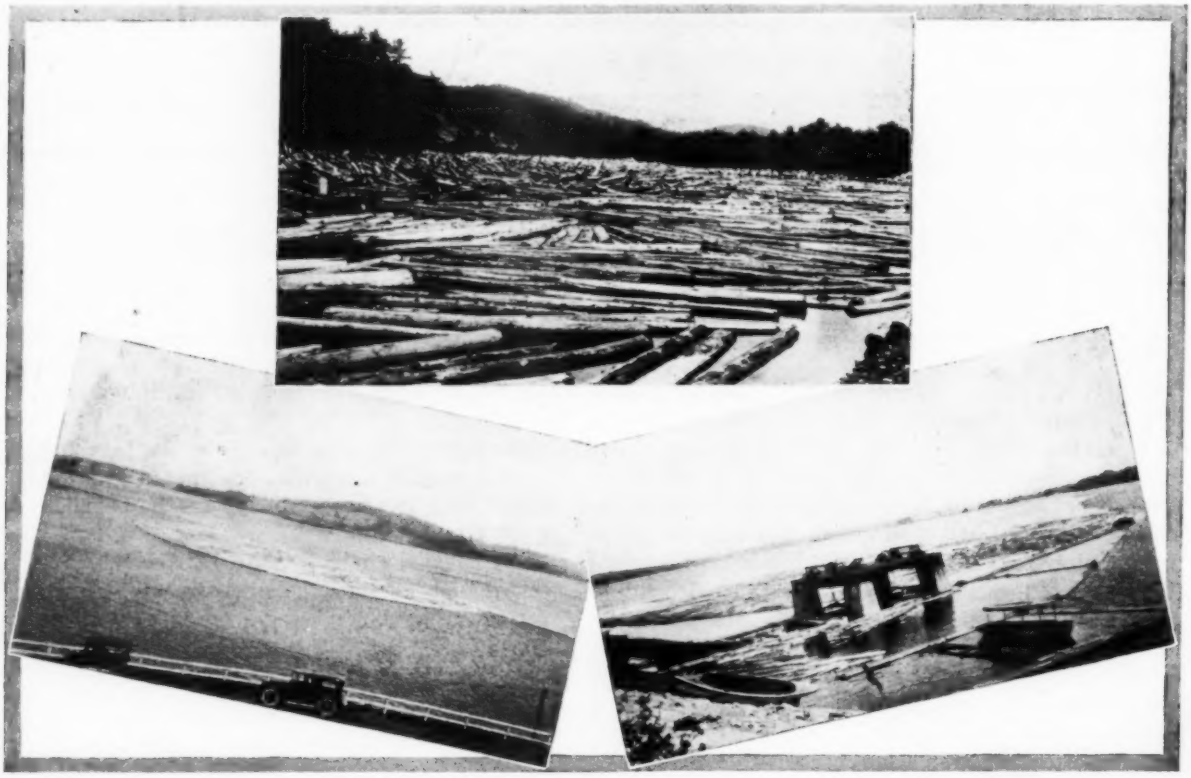
The Parallel Chain Log Haul-up

The framework of a parallel chain log haul-up is of wood or steel and is designed to suit local conditions because it is practically impossible to design a type of frame that would be equally well fitted to all locations. The accompanying elevation drawing shows the general arrangement of a parallel chain log haul-up in which the frame is of timber and of such construction that there is a large factor of safety under average operating conditions. The frame for winch installation (commonly known as the jack works) located at the lower end of the haul-up is of reinforced concrete and structural steel construction. The winches are located upon a heavy plank floor which has been placed upon the structural steel I-beams. Such an arrangement in connection with the log haul hinges permits repairs as well as the adjustment of the lower end of the haul-up through wide limits to suit variations in depth of water during the season's operations.

The head shaft carries the main drive gear and the head or drive sprockets while the tail shaft carries the tail sprockets. Both shafts must be of sufficient strength to withstand the severe strains to which they are subjected and must be placed in suit-

able bearings. The tail shaft bearings are generally adjustable in that they are movable in a lateral direction, and provide a means of regulating the alignment as well as the tension of the chains. One driving sprocket and one tail sprocket is used for each chain. The driving sprockets are relieved from the weight of the chains by means of return chain idlers a horizontal position and at right angles to the direction of motion of the chains. The chain troughs are lined with steel plate (rub irons or buffers) to prevent rapid abrasion.

The chains are driven through the medium of sprockets attached to the head shaft. The details of the drive are dependent upon local conditions.

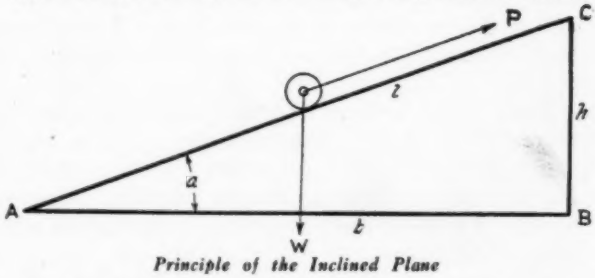


(one for each chain) which are mounted on a shaft and installed under the framework.

The chain is commonly made with steel side links and center links riveted to triangular shaped cast steel wing links. The cast steel wing links or hooks are spaced to suit the size of logs to be handled. They are often spaced approximately 4½ feet center to center the entire length of the chain. These hooks vary somewhat in design and will range from about 6 inches to 10 inches in height, depending upon the average diameter of the logs, together with the degree of incline of the log haul which varies with different mills. The incline of the log haul should not be over 30 degrees if 24-inch logs or larger are to be handled with standard equipment. However, it is possible to change the general arrangement of the log haul and the design of the chains, where conditions are such that a steeper incline is necessary, to handle larger diameter logs. Two or more of these chains are operated parallel to one another and with the corresponding hooks of each chain so arranged that they will emerge from the water at the same time. In this way the logs are carried up the deck in

Figure (*Cross Section of Slasher House*)* shows a friction drive installation with an individual motor for driving. In some cases a belt tightener arrangement is used in place of the friction drive. Either type of drive permits the chains to be started or stopped at will, and operates the log haul chains at a speed of about 70 to 90 feet per minute.

The horsepower required to operate the ordinary type of log haul-up can be easily computed by applying the principle of the inclined plane. In this case, neglecting friction, the work done by force—P—might be recorded as follows:



Principle of the Inclined Plane

*See description of Slasher System in the next installment.

$$P = W \times \frac{h}{l} \quad \text{or} \quad W \times \sin a$$

Let P equal total pull in pounds.
W " total weight of log haul chains and logs on the log haul deck.
u " coefficient of friction—usually .3.
f " factor of safety—2 or more.
a " angle of inclination.
V " velocity of log haul chain in feet per minute.

When the chains and logs are on the point of moving up the log haul, both the force of friction and the force of gravity tend to oppose the motion. *Friction always acts in the direction opposite to that of the motion.* The force of friction is determined by multiplying a coefficient of friction (which has been determined experimentally) by the normal pressure produced by the weight of the logs and chains upon the inclined plane. This pressure acts at right angles to the direction of motion and is equal to

$$W \times \cos a \text{ or } W \times \frac{b}{l}.$$

The force required to overcome friction would therefore equal

$$u \times W \cos a \text{ or } u \times (W \times \frac{b}{l}).$$

The total pull in pounds exerted by force P must be equivalent to the sum of the two forces (friction and gravity).
Since the force to overcome friction equals

$$u \times W \cos a \text{ or } u\,(W \times \frac{b}{l})$$

Courtesy—The Jeffrey Mfg. Co.
Installation of Single Chain Haul-up

Courtesy—Waterous Engine Works Co., Ltd.
Typical Installation of Parallel Chain Haul-up

and that of gravity

$$W \times \sin a \text{ or } W \times \frac{h}{l},$$

the total pull (P) would necessarily equal

$$W \cos a\, u + W \sin a = W\,(u \cos a + \sin a)$$

or

$$W\,(u\frac{b}{l} + \frac{h}{l}). \quad \text{H. P.} = \frac{PVf}{33{,}000}.$$

Therefore,

$$\text{H. P.} = \frac{W\,(u \cos a + \sin a) \times V \times f}{33{,}000}$$

or

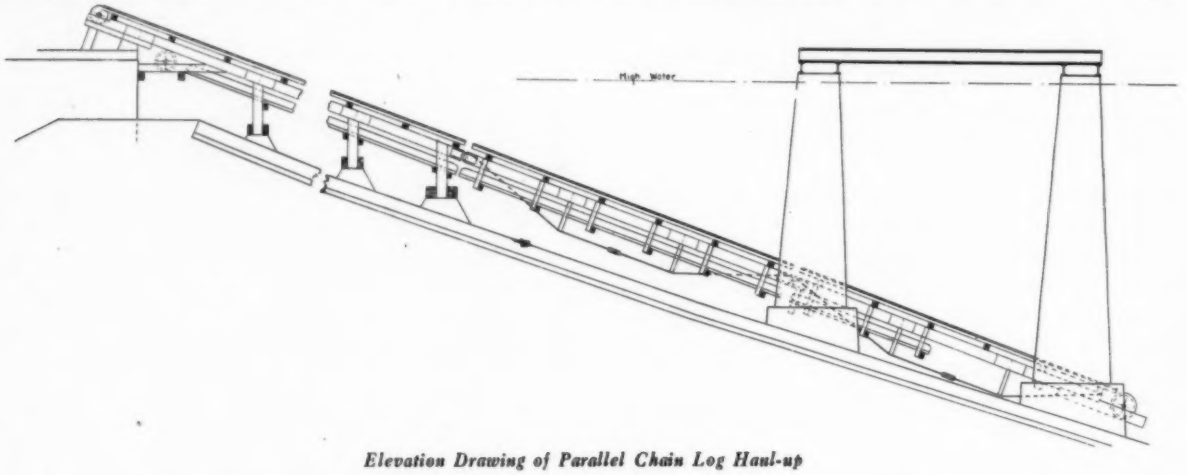
$$\frac{W\,(u\frac{b}{l} + \frac{h}{l}) \times V \times f}{33{,}000}.$$

The daily capacity of a parallel chain haul-up is dependent upon:

1. Speed of chain in feet per minute.
2. Spacing of wing links (hooks) in feet.
3. Average length and diameter of wood.
4. Length of working day in hours.

An installation with hooks spaced 4½ feet center

to center with chain operating at a speed of 86 feet per minute will handle approximately 19 logs per minute or over 11,000 logs per day of 10 hours.* If the average diameter of the logs were 8 inches and the average length 13 feet, the approximate capacity would be about 600 cords per 10-hour day.



Elevation Drawing of Parallel Chain Log Haul-up

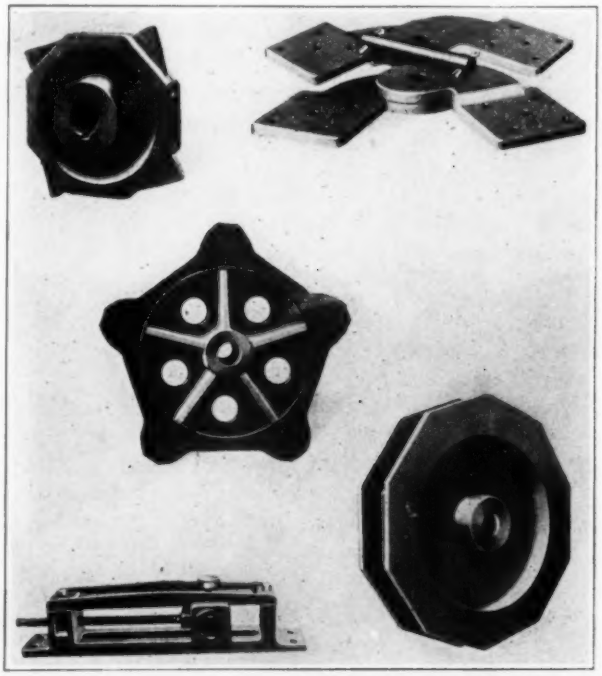
An automatic counting device is sometimes used on this type of haul-up. Such an attachment will record the number of logs passing and thus affords a complete record of all the logs brought into the mill during the day's run.

The logs are floated into such a position by the workmen on the river that as the chains emerge from the water the corresponding sets of hooks (wing links) engage the logs and convey them to an inclined deck at the driving end of the haul-up. The logs discharge automatically from the head end of the haul-up chains to the inclined deck where operators see that they are correctly located before passing to the feed chains which carry them through the slasher. Likewise, it is necessary that the logs be placed upon the haul-up correctly at the point where the wing links are emerging from the water. Otherwise there is a tendency for them to fall back from the conveyor with the possibility of seriously injuring any of the workmen nearby.

Single Chain Log Haul-up

The single chain haul-up is probably an older type of haul-up than the parallel chain and is used in installations where the parallel chain cannot be easily adapted.

The framework may be made of any suitable timber available at the plant which is of sufficient size and strength to withstand rough operating conditions. Proper foundations, as in the case of a parallel chain haul-up installation, are necessary. The framework is constructed simply to give proper support to the trough which carries the log haul chain and logs. The trough, commonly lined with steel rub irons or buffers, is V-shaped and of heavy construction. The bottom of the trough is designed to carry the particular type of chain used in the installation. The lower end of the haul-up is so constructed that it can be raised in a similar manner and for the same purposes as a parallel chain haul-up. However, the jack works are generally simpler and less permanent. The head shaft carries the drive or head sprocket and the main drive gear, while the tail or foot shaft carries a specially designed wheel upon which the endless chain can be easily operated. All shafts should be sufficiently



Courtesy—Canadian Ingersoll-Rand Co., Ltd.

Several Parts of Parallel Chain Log Haul: Upper Left—Head Sprocket; Upper Right—Log Haul Hinges; Left Center—Return Chain Idler Sprocket; Lower Left—Adjustable Tail Shaft Bearing; Lower Right—Flanged Octagonal Tail Sprocket

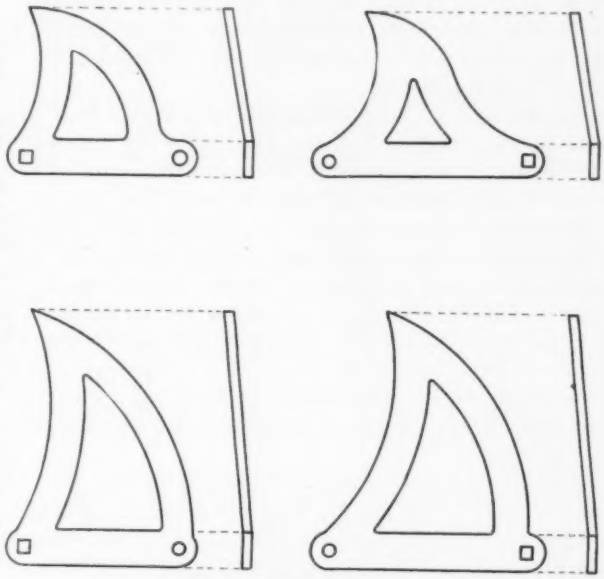
*18 logs, 8" in diameter x 13' long equal one cord of 128 cubic feet.

strong to withstand severe operating conditions and must be placed in suitable bearings for the type of work being done.

A number of different types of chain and attachments are used in single chain log haul-up installations. The accompanying illustration shows several different designs of chains and attachments or spurs. The spacing of the spurs upon the haul-up chains varies from about 4 feet to 8 or even 10 feet. This spacing will depend upon the length of logs being handled. A chain in very common use is made of malleable block links alternating with steel strap side bars, and the spurs formed by replacing the steel strap side bars at regular intervals with a plate extended the desired height to form the spurs. The shape and type of spur and the design of the chain will vary to suit local conditions.

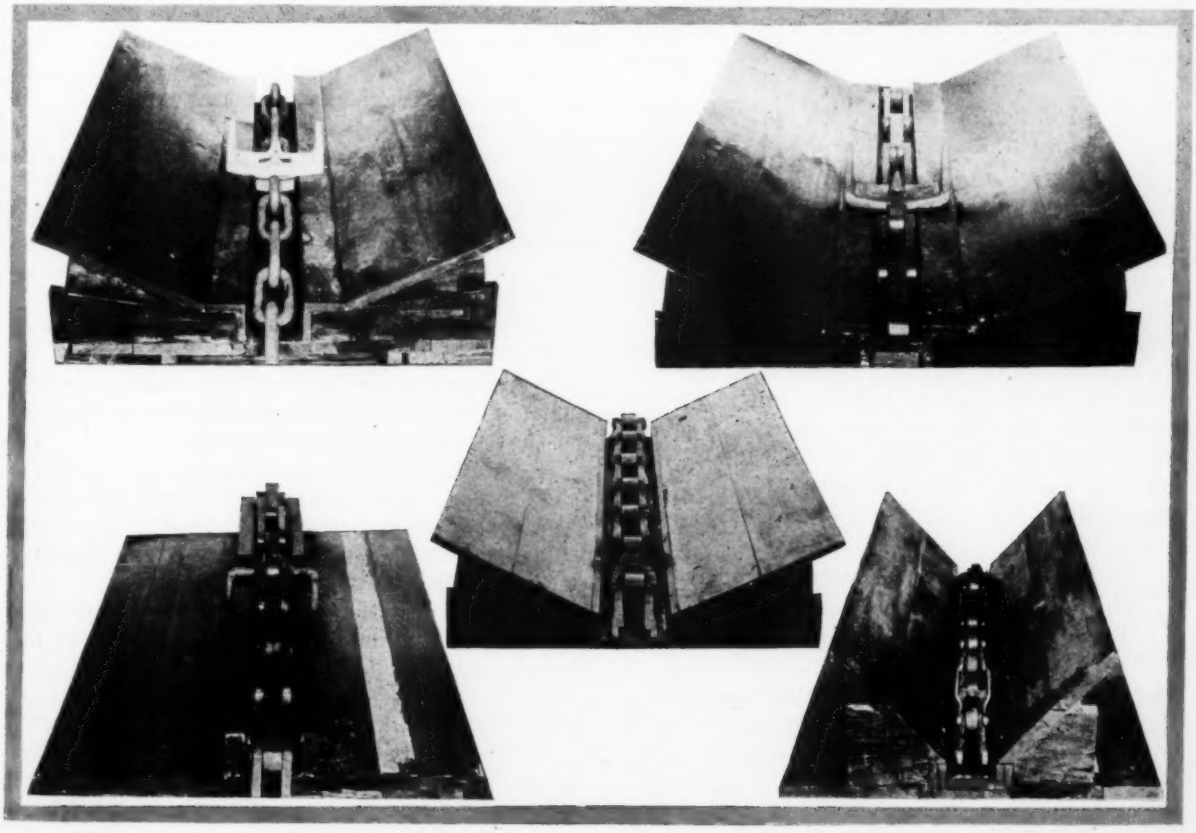
The drive is at the delivery end of the log haul. The main drive gear, attached to the head shaft, is usually operated by a spur gear from a countershaft which is in turn driven through a pulley belt connected to the prime mover. The average operating speed of the log haul chain is approximately 60 feet per minute although under some circumstances it might be as high as 100 feet or even a little greater.

The degree of slope or inclination will vary with the installation. Twenty-five to thirty degrees might be given as an average for the steepest portion of the haul-up.



Parallel Chain Haul-up Attachments

The power requirements would naturally depend upon the length of conveyor, the degree of inclination, capacity, etc. Definite data covering horse-



Several Designs of Log Haul Chains with Spurs

Courtesy—The Jeffrey Mfg. Co.

power requirements are not easily obtainable. A 15 H.P. motor will ordinarily handle a single chain log haul-up 75 feet in length. The power requirements are sometimes approximately determined by figuring about 20% friction plus the pull occasioned by the incline and load.

The log haul is designed to meet particular conditions in each plant. The capacity as in the case of the parallel chain haul-up is dependent upon the speed of the chain in feet per minute, the spacing of the spurs or hooks in feet, the average length and diameter of the wood, and the length of the working day in hours. A typical installation might handle 1,000 to 1,500 13-foot logs, varying from 4 or 5 inches in diameter to 24 inches or even larger per 10-hour day.* If the average diameter of the logs were 10 inches and the average length 13 feet, the approximate capacity of a haul-up handling 1,500 logs would be 100 cords.

The operation of a single chain log haul is very similar to that of the parallel chain with the exception that the logs are placed on the haul-up chain end to end rather than parallel to one another. The logs are floated into such a position by the rivermen that as the chain emerges from the water the spurs at regular intervals along the chain engage the logs and convey them to the head end of the log haul where they are removed from the conveyor trough to an inclined deck. The location of this deck in relation to the log haul is shown in the illustration designated (*Layout of Typical Swing Saw Installation.*)†

This type of log haul is not as efficient as the parallel chain but finds considerable use in mills handling large and heavy logs and in those installations where it is not possible to remove the logs from the pond parallel to one another. It is common practice to use the single chain log haul on the West coast where extremely large logs must first be sawed as if for timber.

Wherever possible it is best to install the parallel chain haul-up. It is especially advisable to use such a system where the logs are to be cut into short uniform lengths with a multiple saw slasher. The efficiency of any haul-up would be determined by a number of factors, the most important of which might be given as:

1. Capacity.
2. Number of men required for operation.
3. Horsepower required.
4. Expenditure in repairs.
5. Life of installation.

The arrangement of saws for cutting the logs may be broadly classified into two systems, namely the Slasher System and the Swing Saw System.

(Continued in next issue.)

*15 logs, 10 inches in diameter by 13 feet long equal one cord of 128 cubic feet.

†See description of Swing Saw System in a subsequent installment.

Glare—What It Is, What It Does

THE following fourteen rules governing the use of light were given in an address by Dr. Charles Sheard, of the Research Laboratories, American Optical Company, Southbridge, Mass., at the consolidated banquet of the American Society of Safety Engineers and the Engineering Section of the National Safety Council, which was held in New York City, January 22.

1—The light should shine on the object under gaze but not in the eyes of the observer.

2—The first remedy is the use of diffusing glass globes, reflectors or shades.

3—The contrast of brightness should be within the ratio of one to 100. This means the adoption of indirect or semi-indirect lighting in which the brightness of the bowls is reduced.

4—Localized lighting should be used only in conjunction with some general system of lighting, so as to avoid marked contrasts.

5—Avoid the glare of reflection from polished surfaces.

6—The eye works with approximately normal efficiency upon surfaces possessing an effective luminosity of one lumen per square foot.

7—Both excessive illumination and inadequate illumination strain and fatigue the eye in order to obtain sharp definition.

8—Intrinsic brilliancy of more than five candle power per square inch should be reduced by a diffusing medium, if the rays enter the eye at an angle below 60 degrees with the horizontal plane.

9—Flickering, unsteady or streaked illumination strains the eye and produces irritation in the eye in its attempt to maintain vision.

10—Special protective glasses should be used to protect the eye from ultra-violet radiation in excess of that present in daylight, as well as infra-red radiation from high temperature molten surfaces.

11—Windows should form as large a percentage of the total wall area as is possible.

12—Window shades used indiscriminately are conducive to contrast glare effects. Translucent screens and shades are generally preferable.

13—Ground glass and the like should be avoided in window sashes which are below the level of the eye, as they cause an increase of brightness in the retinal images thrown on a portion of the retina unaccustomed to such brightness.

14—Dark colored finishes, walls and ceiling should be avoided if eye comfort is desired, since they are likely to introduce flaring contrasts.

There are two kinds of discontent in the world: the discontent that works, and the discontent that wrings its hands. The first gets what it wants, and the second loses what it has. There's no cure for the first but success; and there's no cure at all for the second.—Gordon Graham.

How Production Is Affected by Methods of Firing Boilers—Part II

Suggestions for Firing Soft Coal Under Vertically Baffled Boilers—Practical Hints That Assist in Maintaining Maximum Machine Speed

By JAMES T. BEARD, 2nd

The methods of firing soft coal under steam boilers are quite different from the methods of firing hard coal, described in last months' article. This is due to a difference in the nature of the coal itself. This article describes methods that have been successfully used in plants equipped with vertically baffled boilers. The method of firing soft coal under horizontally baffled boilers will be described next month.

IN A PREVIOUS article, which appeared in the March issue, some practical suggestions were given for firing hard coal under steam boilers. To sum up briefly, hard coal has a tendency to "smother" or blanket the fire. It must, therefore, be fired in small quantities and at frequent intervals, in order to maintain uniform high furnace temperatures and boiler pressure. It must be spread evenly and thinly over the grate.

In plants where soft coal is used, different methods are required. It is the purpose of this article to describe those methods that have been successfully used in connection with vertically baffled boilers of the B & W type and to show how correct firing will maintain a uniform high steam pressure, thus assuring full speed of the engine and paper machine, as well as maximum plant production in terms of paper tonnage.

To understand just what happens when soft coal is fired into a boiler furnace, we must first understand in an elementary way something of the nature of the coal itself. Soft coal usually has much less ash than hard coal, i. e., a greater part of it can be burned to develop heat in the furnace.

But it burns quite differently from hard coal. When soft coal is first fired on a hot fuel bed, the heat in the furnace drives a large amount of gas out of the coal. This gas is known as volatile. Soft coal may have a large amount of it; while hard coal, on the other hand, has practically no volatile gas in it. It is all solid fixed carbon plus ash.

The volatile gas in soft coal burns if properly mixed with air, providing the temperature is high enough to start combustion. When soft coal is fired, therefore, the first thing that happens is the driving out of this volatile gas and the burning of it in the furnace.

The solid fixed carbon plus the ash that was also in the coal is left behind in the grates in the form of coke. It takes much longer to start the coke burning than it does for the volatile gas. Most of the gas is, therefore, pretty well burned up before the coke starts to burn.

Three Things to Remember

In order to burn this gas quickly, efficiently and completely three things are necessary. First, the gas must be mixed with enough air to burn it. Second, the temperature in the furnace must be high enough to start combustion. Third, best results are obtained when the air is very hot before it reaches the gas, otherwise it may have a cooling effect that will delay combustion.

If, for any reason, the conditions in the furnace are not favorable to the rapid burning of the volatile gas, it will pass up the stack unburned or only partially burned. The result will be a large heat loss as represented by the amount of combustible gas that passes out of the boiler setting without giving up its heat. This heat loss will make itself felt in reduced furnace temperatures. The boilers will not steam quickly and their capacity will be limited, depending upon how much this loss amounts to. The fires will not be in the best condition to supply a large reserve of heat to meet sudden steam demands, such as turning live steam into the drier rolls.

But the slow or partial burning of the volatile gas has another undesirable effect. If the gases are not quickly and completely burned before they reach the relatively cool boiler tubes, they will be chilled when they strike the boiler metal. This chilling will deposit soot on the tubes in much the same way that lamp black is deposited on a cold plate when held over a yellow gas flame. When soot collects on the boiler tubes to any extent, it insulates the tubes from the heat of the furnace and prevents that heat from passing quickly through the boiler metal and into the water or steam in the boiler. This heat loss not only represents an actual coal loss, but also prevents quick steaming of the boiler and reduces its capacity to deliver live steam quickly when needed.

When the fires are not properly handled, therefore, they are not in the best condition to meet sudden steam demands, such as are continually arising in paper mill operation due to the variable demand for live steam in the drier rolls. There may also be a fouling of the boiler heating surfaces with soot,

which will still further reduce the steaming capacity of the boiler and lessen its ability to make good when called upon for steam on short notice.

It is folly to expect the fireman to be able to quickly condition the fires, once he notices the boiler pressure

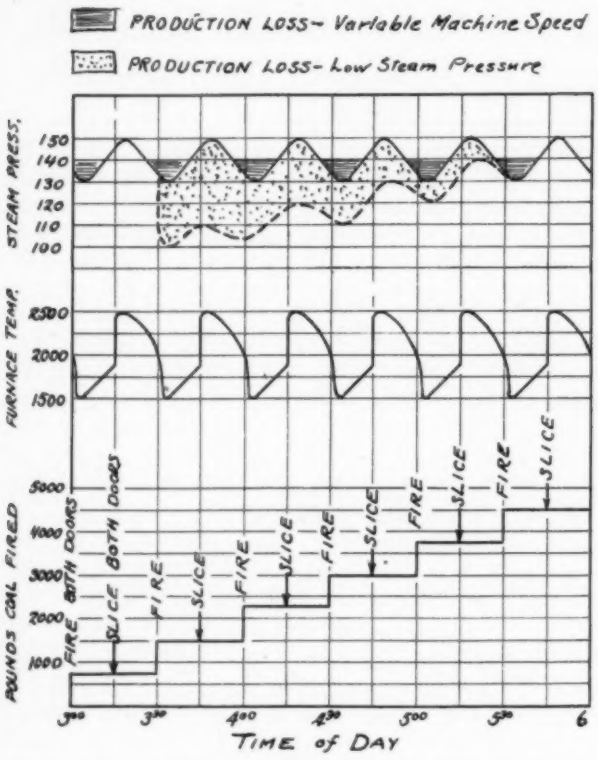


Fig. 1.—Incorrect method of handling soft coal fires. Note that when both doors of the furnace are fired at the same time, there is a big drop in furnace temperature, due to the smothering effect and the inability to burn the volatile gases. A sudden demand for live steam would cause a sharp pressure drop and loss of production

dropping. It is too late then to do much. It is his job, however, to keep those fires in such a condition that they can release a sudden volume and intensity of heat at any time called upon. If they cannot do this the steam pressure may frequently drop sufficiently to slow down the engine, and paper machine and production suffers.

If the steam pressure drops considerably, production may stop altogether. This is not unusual with a green fireman or a poor run of coal.

At first it may seem rather unimportant that the boiler pressure varies, say 15 pounds or more. If the machine speed is not affected it is not so important. But suppose the machine tender should open up the live steam into the drier rolls at a time when the steam is low and the fires are not just right. There may be another 15 or 20 pound drop inside of two or three minutes. A number of these successive drops will often cause a falling off in paper tonnage of ten or fifteen percent for the tour.

To get the proper mixture of volatile gas with air, when burning soft coal, the entire grate should never be completely covered with coal at one firing. With boilers that are vertically baffled the best method is to fire only one side of the grate at a time, leaving a hot bed of live coke on the other side. While the volatile gases are being driven out of the green coal on the one side, they mix with hot air which passes through the other side of the fuel bed and are burned before leaving the boiler setting.

Smothering the entire grate with soft coal reduces the furnace temperaturs and it would not be hot enough to burn the volatile gases, even though they were mixed with air. They would pass off unburned.

After the gases have been driven out of the green coal, the remaining coke begins to burn. In most cases it forms a crust or cake over the fuel bed. This crust must then be broken up with the slice bar. Breaking up the cake has the effect of making a free passage for the air on that side of the fuel bed, so that the coke can be completely burned. It is always followed by the sudden liberation of an intense heat. Experienced firemen, therefore, will immediately break up this crust with a slice bar, as soon as they notice the steam pressure dropping. The sudden intense heat developed makes the boiler steam quick-

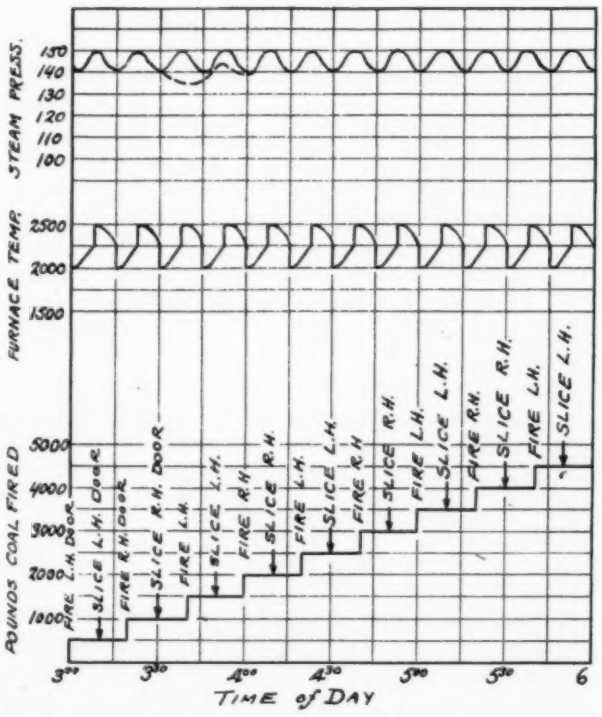


Fig. 2.—Correct method of handling soft coal fires under vertically baffled boilers. When each door is fired and sliced alternately, the smothering effect of green coal is counteracted by the burning of the volatile gases. The furnace temperatures do not vary greatly and uniform steam pressure is maintained regardless of load

ly and the gage needle climbs back to the top of the gage again.

After the broken up coke has been partially burned and is in a hot, active condition, the other side of the grate can be coaled up. This side of the

fire can now be handled in the same manner as the other side was handled. If the firing and slicing are properly timed the fuel bed will be active at all times, the volatile gases will be completely burned and

No.1 BOILER		No.2 BOILER		No.3 BOILER	
L.H. Door	R.H. Door	L.H. Door	R.H. Door	L.H. Door	R.H. Door
FIRE					
		FIRE			
				FIRE	
SLICE					
		SLICE			
				SLICE	
	FIRE				
			FIRE		
					FIRE
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			SLICE		
					SLICE

Fig. 3.—Chart showing correct method of handling soft coal fires in a 3-boiler plant

there will always be a reserve of heat to meet sudden steam demands.

Firing Boilers Alternately

In plants where there are more boilers than one in active service the boilers can be fired alternately. First, fire through the left-hand door of No. 1 boiler. Then proceed to Nos. 2, 3 and 4 and do the same. Then come back to No. 1 and break up the fire on the left-hand side of the grate. Do the same with Nos. 2, 3 and 4.

Then, taking the right-hand fire door of No. 1, coal up on that side of the grate, proceeding in turn to Nos. 2, 3 and 4. Returning to No. 1, break up the fire on the right-hand grate, doing the same with the other fires in rotation.

Smoke prevention may or may not be a serious factor in the handling of soft coal fires, depending upon the location of the mill and upon the local ordinances governing such things. Smoke is due to the presence of fine particles of soot, unburned coal or ash in the stack gases. Ash particles usually give a faint gray appearance to the smoke. They are not smudgy and produce a smoke that is not generally deemed objectionable.

When the smoke is black or very dense, however, it is caused by the presence of unburned soot particles and coal dust. This soot is often the result of a sudden chilling of the furnace gases, as described earlier in this article. Excessive and unnecessary slicing of the fires should be avoided, because it suddenly releases large volumes of gas which cannot be completely burned before they reach the boiler tubes. The chilling effect of the cooler metal produces soot and smoke, which passes up the stack.

Stokers are always superior to hand-firing and, in certain cases, may become necessary from the standpoint of smoke prevention. The gradual and continuous feeding of coal into the furnace assures a uniform combustion and makes smokeless operation possible. Where the boiler is set too low, however, smoke will be produced, even with automatic stokers. The only remedy in such cases is to raise the boilers higher above the grates.

If the smoke is due to the presence of fine particles of coal dust, such a condition is caused by excessive draft. It is difficult to remedy this condition without adding boiler capacity and cutting down the draft on individual units.

Incomplete combustion and the resultant smoke may often be prevented by introducing a supply of heated air into the furnace over the fire bed. This auxiliary air supply mixes with the combustible volatile gases. If it is sufficiently heated and properly introduced into the furnace, the gases can be burned before they come in contact with the boiler metal surfaces.

The same general precautions apply to the cleaning of soft coal fires as for hard coal. The ash content, however, is not so high, and it will not be necessary to clean so frequently, since the ash will accumulate less rapidly. The time between cleaning periods will be determined by the quality of the coal, remembering that as the ash collects on the grates the fires become more sluggish and react more slowly to sudden loads and steam demands.

Some soft coals clinker badly. Care should be taken in handling fires and judgment should be used in slicing. Mixing the hot coke with the dead ash will often melt the ash and form clinker. It should not be necessary to dig the slice bar deep into the fuel bed merely to break up the surface crust and let the air get through. If the exhaust steam of a blower engine is led to the ashpit and discharged from a perforated pipe, it will usually break up the clinker formation. An excess of exhaust steam in the ashpit, however, is harmful and should be avoided.

Generally speaking, soft coal fires lend themselves better to quick steaming than hard coal fires. This does not mean that they require less intelligence in handling. When they are improperly handled they can cause infinitely more trouble than hard coal fires. Following the simple suggestions outlined in this article will go a long way toward maintaining the proper condition in the fuel bed necessary to the attainment of continuous and reliable operation of the paper machine and maximum plant production.

Waste in the Pulp and Paper Industry

Fibre Mills

By B. T. McBAIN

3rd Vice-Pres., Am. Pulp and Paper Mill Supts.' Assn.

THE waste in the fibre mills throughout the country is so great that a fortune is wasted in some mills annually.

Starting with wood preparation and ending with the delivery of the stock to the beaters or in lap form for shipment, in many mills, there is waste, particularly where old out of date equipment is still in use.

There are mills using the old, flat, sulphur burners and without combustion chambers or measuring devices.

There are mills still using the old, leaky wooden towers installed early in the game by builders of sulphite mills.

There are mills still receiving wood with bark on and barking this wood by mechanical disk barkers with automatic wood handlers, turning the wood out as perfectly round as though handled in a lathe.

There are mills still using 8,000 pounds to 10,000 pounds of steam per ton of sulphite, even at the present high cost of coal and other fuel.

There are mills still operating with blow pits with open bottoms draining into the sewer and into the river to waste.

There are mills still operating without white water systems for return and reuse of white water from deckers and wet machines.

There are mills still working without screenings refiners and without any method of ascertaining the amount of screenings being made and wasted, let alone knowing the value thereof in the market.

Nearly every sulphite superintendent has his own ideas as to methods of cooking, strength of acid, how made, etc., and I am not going to say anyone is better than the other, but none of the items mentioned would in any way change the method of making acid or the way of cooking, nor the quality of the pulp being produced, though many mills are wasting lime and sulphur at the acid system, and at the digesters.

Many mills are wasting wood by improper methods of cooking and too great an amount of screenings.

And the mill is not yet extinct where a poor off quality or off color cook is blown into the river to cover up the sins of the pulp mills, while such pulp has a value in the market sufficient to return the wood cost at least.

But one of the greatest wastes yet unmentioned is that of labor. Mills will be found where twice as many men per ton are used as in other mills, while a few labor saving devices at not great cost would reduce this waste very greatly.

The day is coming when all sulphite mills will reuse everything in their process, the same as the packers use everything in theirs.

Today many mills are saving the heat from one digester and using it in the next one steamed. Today some mills are producing a high grade pulp by quick cook methods in 6½ to 8 hours, the equal of pulp made by the slow cook Mitscherlich process and some mills are bleaching this pulp so made with resulting paper stronger than the unbleached varieties made by other plants under slower cooking conditions.

Many mills are using twice the number of screens per ton that other mills use with resultant loss of power, investment and labor, the pulp produced still being of inferior quality to that made under more economical screening conditions.

The day will come when wood will cost enough, if it isn't here now, so it will be weighed as it enters the digesters and the product will be all weighed before going to the paper mills. The sulphite superintendent will be held to account for a certain production from a certain amount of wood, and when this is done there will be less waste in the Industry because each man in the game will then be forced to stop up every leak and to learn better how to cook without waste.

These same conditions apply to the Kraft and soda fibre mills as to the sulphite.

There is at least one mill now operating under these conditions with enough return on the investment to pay for the additional equipment and cost of operation each year many times over, yet even that mill is still operating some very poor out of date equipment in connection with its fibre producing plant.

Why do we shut our eyes to waste and think we can beat the game?

It is not the critic who counts, nor the man who points out how the strong man stumbles, or where the doer of deeds could have done better. The credit belongs to the man who is actually in the areana; whose face is marred by dust and sweat; who strives valiantly; who errs and may fail again and again, because there is no effort without error and shortcoming, but who does actually strive to do the deeds; who does know the great enthusiasm, the great devotion; who spends himself in a worthy cause; who, at the best, knows in the end the triumph of high achievement, and who at the worst, if he fails, at least fails while daring greatly, so that his place shall never be with those cold and timid souls who know neither victory nor defeat.—Theodore Roosevelt.

Preparation of Sulphite Liquor

By H. T. TENEN*

This article is concerned with a discussion of the conditions governing the preparation of bisulphite liquor by the tower process, which is most widely used of all the methods at the present time.

BISULPHITE of lime lye is obtained by the action of sulphur dioxide gas in passing through a tower filled with pieces of limestone and irrigated with water. The water is introduced at the top of the tower and is sprayed down the tower, at the bottom of which the sulphurous acid gas is introduced. Hence the gas and the water move in counter-current through the tower. A reaction takes place in the presence of carbonate of lime which results in the formation of bisulphite liquor which runs out of the tower at the bottom, being collected in suitable tanks.

This liquor, which is often called acid liquor, is, properly speaking, a solution of sulphurous acid gas and bisulphite of lime in water. The chemical reaction which takes place in the formation of the liquor may be depicted in the following equation:

$$2\,SO_2 + CaCO_3 + n\,H_2O = CaH_2(CO_3)_2 + (n-1)\,H_2O + CO_2$$

Carbon dioxide gas, which is a by-product of this reaction, escapes at the top of the tower.

Preparation of Sulphur Dioxide Gas

Sulphurous gas, sulphur dioxide, sulphurous anhydride, as this gas may be called, is easily obtained by the combustion of sulphur in air. In other words the oxygen in the air combines with the sulphur to give sulphur dioxide. In practical work the combustion takes place in furnaces. As far as the design of sulphur furnaces is concerned, it may merely be mentioned that this apparatus is designed in such a fashion that a complete combustion of the sulphur is obtained. The furnaces are provided with devices which prevent the extinguishing of the sulphur during the burning process by the accumulation of mineral or organic impurities, such as sulphate of lime and bituminous matters.

(The author gives a rather detailed description of the operation of pyrites burners and the conditions that govern the same, but this is omitted for the reason that it has no important bearing on American practice.—Trans.)

Purification of the Sulphurous Acid Gas

The purification of the sulphurous acid gas also pertains more particularly to the product that is obtained from burning pyrites. In that case a dust chamber must be provided for removal of the dust that is entrained along with the gas coming out of the burners. The gas is also made to pass through washers, which not only remove impurities, but also eliminate the sulphur trioxide, which is always formed in a certain quantity in the combustion of sulphur or sulphur compounds. The trioxide is dissolved in the water and thus is not permitted to come in contact with the lime in the tower with resulting formation of sulphate of lime, which is not desirable. The sulphurous acid gas produced by the burning of sulphur can also be treated in this manner.

After the gas has been washed it is generally customary to pass it through one or more coolers. These are made of staggered piping, which is placed in a container filled with water or else the water may be allowed to circulate over the piping, which increases the cooling surface.

Importance of the Cooling Process

The cooling of the gas is actually one of the most important steps in the process of making bisulphite liquor. It is necessary that it be carried out very thoroughly and carefully in order to obtain a liquor of good quality. It is requisite that the temperature of the sulphurous acid gas, which is in the neighborhood of from 400 to 500 degrees C. at the exit of the combustion furnace, be reduced to about 20 degrees C. before it enters the foot of the tower.

The water vapor which may be entrained with the sulphurous acid gases when they leave the furnace is condensed in the coolers and the water, containing an appreciable proportion of sulphur dioxide gas, is collected and used as wash water.

The Bisulphite Towers

After the gas has passed through the purifying apparatus, it enters the sulphite towers. These towers may be constructed of wood. They are also made of concrete reinforced on the inside with a brick lining which is resistant to acids. The dimensions of sulphite towers vary from 25 to 35 meters in height and from one and a half to two meters in diameter.

A grid is placed at a height of about one meter above the base of the tower and this serves to hold the pieces of carbonate of lime with which the tower is filled. The gas is introduced into the tower underneath the grid. Suitable openings are arranged in the walls of the tower for the removal of the spent calcareous residues, and sediments of sulphite of lime which can form both above and below the level of the grid and prevent the easy passage of gas and liquor in their course through the tower. A suitable outlet in the base of the tower is provided for the quick and

*The author is indebted in part for his information to an article recently published in Le Papier.

effective emptying of the sulphite liquor formed therein.

Due to the fact that there are free spaces between the pieces of limestone with which the tower is filled, the gas infiltrates through the mass without any difficulty and passes up the tower while a stream of countercurrent water flows down the same. The contact of these substances results in the formation of the sulphite liquor according to the equation which has been given above. However, the liquor does not consist entirely of bisulphite of lime, for the latter decomposes to some extent in accordance with the following formula to give both calcium sulphite and sulphurous acid:

$$CaH_2(SO_3)_2 = H_2SO_3 + CaSO_3$$

The liquor obtained in practical work is a solution containing variable proportions of sulphite of lime and sulphurous acid.

Chemical Make-Up of the Sulphite Liquor

From a chemical standpoint there may be distinguished in the liquor two ingredients, free sulphur dioxide and combined sulphur dioxide. The two together give the total sulphur dioxide in the liquor. A brief description of the analytical method used in determining the two ingredients follows.

1—Total sulphur dioxide is determined by titration with tenth normal iodine solution.

2—Total acidity is determined by titration with tenth normal soda solution.

3—Free sulphur dioxide is obtained by taking the difference between total acidity and total sulphur dioxide.

4—Combined sulphur dioxide is obtained by taking the difference between total sulphur dioxide and free sulphur dioxide.

5—The lime content is obtained by the following formula:

$\frac{7}{8} \times$ percentage of sulphur dioxide, combined.

Composition of Liquor—Effect of Different Constituents

There are various conditions which can change the proportion of free sulphur dioxide in relation to the proportion of lime in the liquor. A maximum amount of 12 grams of lime per liter must not be overstepped in liquors made in a tower, but this proportion should be maintained in the neighborhood of nine grams per liter in order to obtain good results in the subsequent digestion of the wood pulp.

Moreover if the temperature of the gas is too high, as it enters the tower, the liquor is heated up and the proportion of sulphur dioxide dissolved in the same becomes less with the result that the concentration of calcium sulphite becomes greater. In fact, the solubility of sulphur dioxide in water diminishes very rapidly as the temperature increases. This is the main reason why it is necessary to cool the sulphurous acid gases to about 20 degrees C. before they enter the tower. A temperature of about 12 to 15 degrees C. at the foot of the tower gives good results. It is also evident that the water that is employed in the manufacturing process possesses as low a temperature as possible. The temperature conditions must be carefully controlled, particularly in the summer-time.

Percentage of Sulphur Dioxide in Burner Gas

The percentage of sulphur dioxide in the sulphurous gas coming from the sulphur burner also has an effect on the content of sulphur dioxide in the liquor. When the percentage of sulphur dioxide in the burner gases is high, from eight to ten percent, then the proportion of free sulphur dioxide in relation to the total sulphur dioxide increases; the proportion of free sulphur dioxide decreases, however, when the percentage of sulphur dioxide in the burner gases decreases to from three to four percent. The variation in the composition of the liquor brought about by the variation in the concentration of the sulphur dioxide in the burner gases is, however, much less than that which is caused by variation in the temperature of these gases.

Composition of the Limestone

The composition of limestone that is employed in filling the sulphite tower is also of importance in regard to the constitution of the liquor. The content of CaO in the limestone is the important factor from this standpoint. Soft limestone is easily attacked by the sulphurous gases, the liquor becomes saturated with lime and at times the stone crumbles away to the point of obstructing the interstices between the pieces of rock as well as filling the openings in the grid. The results are then disadvantageous both from the standpoint of pulp manufacture with the liquor that is manufactured from such limestone, and also from the viewpoint of the expense involved in cleaning out the obstructions from the tower so that it may function properly.

The most satisfactory kind of limestone to use in the process of making sulphite liquor is the one that goes under the name of building stone and which comes in blocks about 20 to 30 centimeters square. It should be quite pure and contain at least 98 percent of $CaCO_3$. A calcareous stone containing more than two percent of impurities should be rejected, for the sulphite liquor made from this rock will carry the impurities along with it and deposits will be formed in tanks and pipe-lines which sooner or later will block them up.

The quantity of water that is employed in the manufacture of sulphite liquor does not appear to have any effect on the content of free or combined sulphur dioxide in the product. A saline water may be used to make the liquor without any inconveniences either in its manufacture or in the subsequent use of the liquor in the digestion process.

The average sulphite liquor made in towers from

burner gases does not contain any more than 25 grams of total sulphur dioxide gas per liter for a content of from 14 to 17 grams of free sulphur dioxide and 7 to 10 grams of lime per liter.

Recuperation and Regeneration

In order to increase the content of free sulphur dioxide in the sulphite liquors, which is the most important factor in the manufacture of sulphite pulp, the tower liquor is treated with the gases that escape from the digesters. The recuperation of these gases is one of the most important problems in the manufacture of sulphite liquors. This is quite easy to effect and regulate when the indirect or Nitscherlich process of making sulphite pulp is employed, but when the sulphite digestion is carried out by the direct process or Ritter-Kellner method, then the operation is complicated. In this article the author is merely concerned with the recovery of the gases that come from digesters in which indirect digestion takes place.

There are many systems used in the recovery of the gases that escape from the towers, thus avoiding a total loss of the sulphur dioxide.

Recovery of Gases Escaping from Towers

The carbon acid gas which escapes through the top of the tower always contains a certain proportion of sulphur dioxide which can attain considerable value at times. On the other hand, this gas is harmful to the laborers who fill the tower with broken limestone. Certain plants use the following arrangement to get away from this difficulty.

The waste gases which escape from the first tower of a series are made to enter a second tower at the bottom and finally escape from this into the air after first passing through a chimney which discharges the bad odors into the upper air. In this simple installation the weak sulphite liquor which comes from tower number 2 is pumped to the top of tower number 1 in which it is strengthened by coming in contact with more sulphur dioxide in its passage down the same. A third tower, called the recovery tower, sometimes completes this installation. The gases which escape from the other towers, after first being cooled in some convenient manner, are passed through this tower.

When this practice is followed, the liquor obtained from tower number 1 is pumped to the top of tower number 3, from which the residual gases are made to pass through tower number 2. Tower number 3 is generally filled with packing.

Under these conditions the sulphite liquor is made entirely in the system of towers. After it has attained the proper concentration it is run into a receiving tank, from which it is removed to the storage tanks. There it is tested with an ordinary hydrometer which tells just how much water must be used in irrigating the towers. The receiving tank is of the closed type in order to avoid the escape of sulphur dioxide which is caused by the eddy currents induced by the constant entrance of new liquor into the tank.

Details of Operation

In other installations the water which comes to the top of the recovery tower and which is a solution of sulphur dioxide may be used in bucking-up the liquor that is obtained from the sulphurous gases from the furnace. It is also possible to control the amount of lime in the sulphite liquor by mixing together the proper proportions of liquors obtained from the several parts of the apparatus. The flexibility of this method of procedure is great and enables the operator to obtain a liquor of any desirable strength and composition.

More Simple Method of Recovery

However, while the results obtained from this system of operation are very good, nevertheless very accurate manipulation and control of the apparatus are necessary in order to secure them. Therefore the simpler method which is described below is preferred. In this case the gases come into the bottom of the sulphite liquor tank and are distributed through a perforated pipe, being dissolved in the same. This liquor is then directly used in the digestion of the pulp. If the operations of digesting the pulp and recovering the waste gases are carried out in the proper fashion, and if the tank is located in a convenient spot and possesses the required capacity, the recovery process can result in a saving of from 50 to 60 percent of the total amount of sulphur that is contained in the sulphite liquors.

Example of Saving Effected

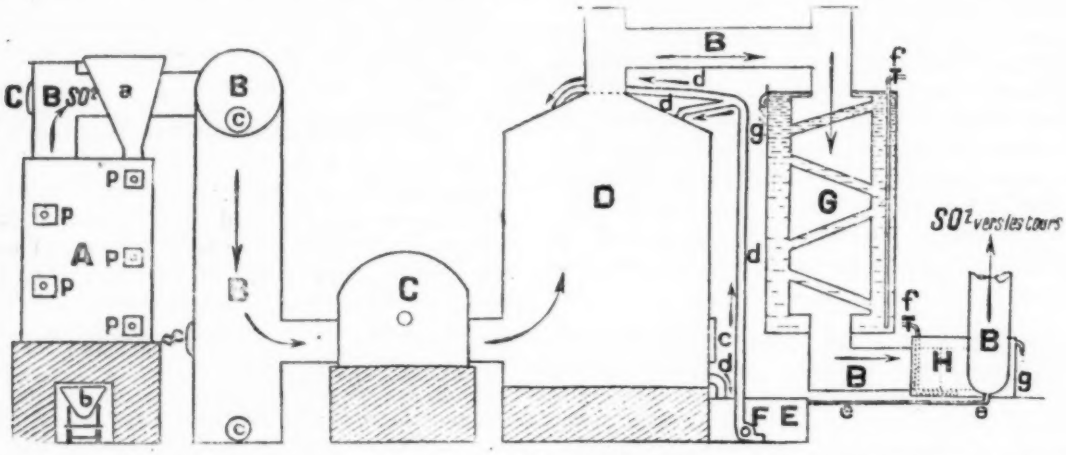
For example, if the operation is commenced with an initial content of "a" pounds of sulphur dioxide in the sulphite liquor, if the percentage of sulphur dioxide recovered, which of course is constantly varying, is called "t," and if it is assumed that no new liquor is added to the stock after each digestion, the content of sulphur dioxide in the liquor will become as follows:

At the first recovery....a $(1+t)$.
At the second recovery..a $(1+t)$ $(1+t_1)$.
At the third recovery...a $(1+t)$ $(1+t_1)$ $(1+t_2)$.

Similar equations may be written for each recovery thereafter. The relation is one of a geometric progression and the percentage of sulphur dioxide reduces until the supply of liquor is entirely exhausted. In reality this is not the way in which the process is carried out in practical work. A little new sulphite liquor is continually added to the supply on hand and recovered from the digesters in sufficient quantity to take care of the daily consumption of the mill. Another point that must be borne in mind, and that is that sulphur dioxide is not infinitely solu-

ble, but the increase in the amount of sulphite on hand will be balanced by the increased solubility of the sulphur dioxide in the same.

From a practical standpoint the quantity of liquor in the sulphite tanks is determined in an empirical manner. The capacity of the tanks is figured in cubic meters from the number of tons of pulp that the mill can produce in a month's operation. Hence, in other words, the capacity of the tanks in cubic meters is equal to the monthly capacity of the plant in tons of pulp produced. This practice leads to the building up of an excess stock of sulphite liquor which gradually accumulates sulphur dioxide and acts as a reserve.



A—The pyrites furnace or sulphur burner.
a—Funnel for charging pyrite.
b—Small cart for cinders.
p—Peep-holes.
B—Gas mains and collectors.
c—Openings for cleaning out dust.
C—Gas fan.
D—Washer.
E—Tank for gas wash water.
F—Pump for circulating wash water.
d—Wash water pipe with arrows indicating the direction of the circulation of the water.
G—Cooler (shown in sectional view), showing small cooling water pipes.
H—Cooler with baffles.
ee—Pipe line for conducting the condensed water into the coolers.
f—Valve controlling flow cooling water.
g—Overflow of water which has performed its cooling action.

Losses of Sulphur Dioxide and Precautions Necessary to Avoid Them

In order to obtain good results it is absolutely necessary to avoid any loss of gas. Valves and connections should be made very tight and all tanks should be hermetically sealed. The latter condition is particularly necessary to follow out in the case of tanks in which the gas recovered from the digesters enters, for there is produced there a violent boiling effect and a very strong evolution of sulphur dioxide. There is even a certain pressure in these tanks. There are certain mills which follow the practice of connecting these tanks with the towers and leading the sulphur dioxide gas from the tanks into these towers to be absorbed by dilute liquor.

Furthermore, it must be remembered that the sulphite liquor is unstable, that sulphur dioxide gas is evolved quite rapidly even at the ordinary temperatures, and moreover the more rapidly the greater the surface of evaporation. The author himself has had an opportunity to observe in many different cases the manner in which the evolution of sulphur dioxide takes place under these conditions. Below there is given a résumé of a series of experiments and observations that he made himself.

Experiments with the Liquor

A sample of the liquor was placed in a graduated cylinder having a capacity of one liter and another sample was placed in a beaker of the same capacity. Both vessels were covered with a piece of plate glass and they were left alone for several days. The composition of the liquor in each vessel varied as shown below:

LITER CYLINDER

	Total sulphur dioxide	Free sulphur dioxide
Analysis of the original liquor..	31.68	21.44
At the end of one day.....	30.4	20.16
At the end of four days.....	28.16	17.92

LITER BEAKER

Analysis of the original liquor..	27.2	15.36
At the end of one day.....	25.28	13.44
At the end of four days.....	21.44	9.6

These figures give some idea of the loss of free sulphur dioxide that can take place when the liquor is exposed for a few days in a vessel which is not tightly closed. And, furthermore, it must be emphasized that in the test which is described above the liquor was not subjected to agitation or bubbling, which ordinarily takes place in the tanks, due to the filling of the same and the process of recovering the sulphur dioxide. In order to take into consideration these actions which occur in practical operations, air was caused to bubble through the sulphite

liquor samples at an average rate of thirty grams per liter of sulphur dioxide. After the bubbling the air contained a proportion of sulphur dioxide which varied between 1.2 and 3.3 percent.

Conclusions Derived from Experiments

The conclusion which must be derived from these experiments is that the tanks should be kept as tight as possible. Then again it is necessary to avoid as far as possible disturbing the liquor in the tanks or pumping it around by means of pumps. And it is essential that all contact of the liquor with the surrounding air be avoided as far as possible.

It is unnecessary to state that the condition of the digesters, and particularly the coils that are used in them for the circulation of the steam employed in heating the contents, should be in perfect condition. If, for example, the coils are defective and leaky, steam will escape from them and act directly as a heating agent. The steam would be condensed and would fill up the digester. There would undoubtedly be a certain amount of gas which would escape, but this would be mixed with considerably more steam and used liquor, which would dilute the fresh liquor and lower its proportion of sulphur dioxide in place of increasing it.

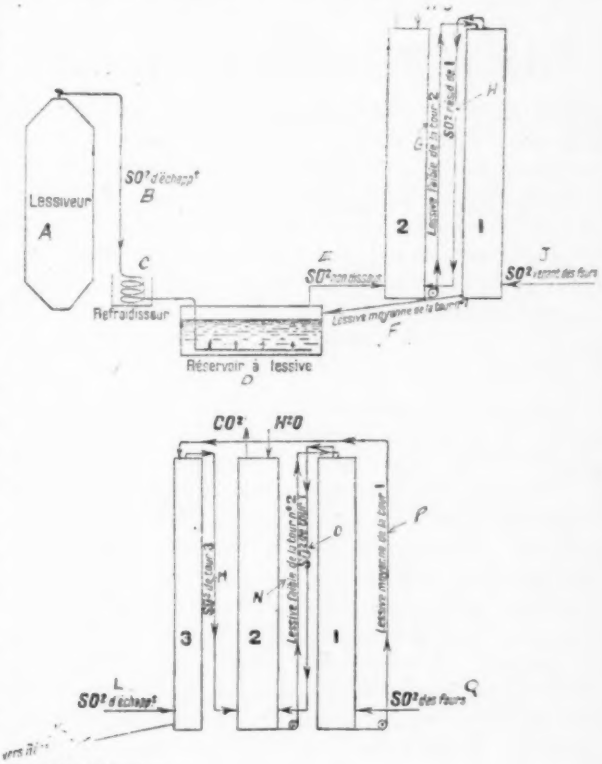
Characteristics of a Good Grade of Sulphite Liquor

A good grade of liquor should contain a considerable proportion of sulphur dioxide, 30 to 35 grams per liter, with a proportion of lime not in excess of nine grams per liter. Paper mills have been known to conduct their digestion operations over a period of from fifteen to twenty hours in digesters which yielded fifteen tons of pulp in each operation, with a maximum pressure of twelve kilograms and with sulphite liquors whose sulphur dioxide content exceeded 45 grams of total sulphur dioxide per liter and 35 grams of free sulphur dioxide per liter, and with a lime content which varied between five and eight grams per liter. The tower liquor had a content of from 18 to 22 grams of total sulphur dioxide per liter and between seven and ten grams of lime per liter. The recovery of sulphur dioxide which took place in the liquor tanks, due to the amount of water vapor that was condensed, resulted in a reduction of the lime content to about two grams per liter.

When the contents of lime in the liquors increases beyond nine to ten grams per liter, there is formed both in the tanks and in the pipe lines incrustations of neutral sulphite which can finally stop up the lines altogether and prevent the proper functioning of the pumps. Such incrustations are also produced on the steam coils in the digester during the boiling process. The coils then become covered with a layer of neutral sulphite which adheres to the metal with great tenacity when the coating is first formed, but which can be rather easily removed after the layer of sulphite has attained a thickness of several millimeters. However the formation of a layer of sulphite over the heating coils constitutes a serious obstacle to rapid and economical digestions, for the coefficient of heat conduction of this material is small. Furthermore, due to the constant blows that must be given the coils in order to detach the adherent layer of sulphite, injury is done them and their life is shortened.

Control of Production of Liquor and Yield

The manufacture of sulphite liquor must be carried out under methodical and strict control. In the first place it is necessary to know every twenty-four hours the exact weight of sulphur that is burnt in the burners, the quantity of liquor that is made, the quantity of liquor that is used in the digestion operation, and the analysis of the same. This is, therefore, a problem of making accurate measurements, and once these are made and established, they will immediate-



A—The digester.
B—Escaping sulphur dioxide gas.
C—Cooler.
D—Sulphite liquor tank.
E—Non-dissolved sulphur dioxide.
F—Moderately concentrated liquor from tower No. 1.
G—Weak liquor from tower No. 2.
H—Residual sulphur dioxide.
J—Sulphur dioxide from towers.
K—To the tank.
M—Sulphur dioxide from tower No. 3.
N—Weak liquor from tower No. 2.
O—Sulphur dioxide from tower No 1.
P—Moderately concentrated liquor from tower No. 1.
Q—Sulphur dioxide from the furnaces.

ly show just how the manufacturing process is progressing.

In the second place it is absolutely necessary to

exercise a very strict control over the chemical and physical conditions under which the manufacturing is conducted. The temperature of the gas should be determined and an analysis should be made of it. The loss of sulphur dioxide at the top of the towers, the pressure of the gas in the pipe line and at the foot of the towers, the temperature of the water used in the manufacturing process and that of the sulphite liquor made, the amount of gas taken from the digesters and recovered must all be known and exactly controlled throughout the progress of the manufacturing process.

All these conditions must be constantly watched and attention must be given to improving them so that the plant operates with the highest attainable efficiency. By observing these conditions carefully and making periodic analyses, it is possible to know each day just what yield is obtained and how well the process is functioning. It is more advisable to determine the yield by making observations covering a longer period of time, generally for a month's operation at least. But this method of controlling the plant must only be used in conjunction with a daily control, for too long a time can elapse before an error in the manufacturing process productive of low yields and poor efficiency will be discovered and remedied.

Pointers for the Engineer

By W. F. SCHAPHORST, M. E.

Value of Recording Instruments

RECORDING instruments are to be had for almost every purpose these days—for making graphical records of steam pressures, air pressures, and other pressures, temperatures of anything under the sun, vacuums, speeds, water levels, etc. Even the night watchman's movements are commonly recorded on paper in a similar manner, to keep him from going to sleep while on duty. We are all more or less familiar with the CO_2 recorder. And so it goes all the way down the line.

There is no question but that these records are of great value to the engineer, superintendent, and owner of the paper mill. The superintendent or president can have all of the various gauges placed before his eyes over his desk, and thus he can keep in touch with every branch of his plant at all times. If something went wrong the week before at a certain time he can refer back to the records made at that time and perhaps deduce cause for the error or accident. Thus recently there was a disastrous boiler explosion in the South and it is "presumed" that the pressure ran too high. Nobody lives to tell about it. If the boiler plant had been provided with recording instruments there would be little question about the cause.

I was considerably interested not long ago in a record of the amount of power that was transmitted through a belt. A recorder gave the power that was being transmitted through the drive. The belt was slipping, however, and was not carrying as much power as was desired, so the superintendent decided that he would try covering the pulleys with canvas. He did so and the recorder immediately showed a "hump" at the point where the covering was applied, and from that time on there was no more slipping and full power was transmitted.

A little rough figuring proved to my own satisfaction that the belt had been slipping about 5 percent. The covering reduced the slip to 2 percent, which doubtless is due to the natural creep always to be found in a belt and cannot be avoided. Hence the pulley covering caused a clear gain of 3 percent of power without adding one whit to the load on the engine. Besides, it is quite possible that the belt will last longer now that the slip is reduced 3 percent. Friction is the thing that wears out belts, and the principal friction in a belt is that due to slip. On the other hand, it is better to avoid slip without the use of coverings if possible. Coverings should be used only as a last resort.

Having never seen a record of this kind before, showing so clearly the benefits accruing from the stopping of belt slip, the writer thought it worthy of mention. It certainly should interest engineers and belt men because of the large number of belts usually in their charge.

How Much Does Boiler Scale Cost?

I AM in receipt of two comments on my chart regarding the cost of boiler scale which appeared in the February issue. The first letter stated that the trouble with the chart is that "it doesn't catch the loss until AFTER the fuel is lost, and that it would be much better if I could develop a chart that would PREVENT losses and not get there after the horse is stolen."

That sounds good, but, unfortunately, I fear there is no other way. The usual practice is to go ahead and allow losses to occur, and then, after the losses can be seen or felt provision is made for stopping them. Practically the same arguments are used by all manufacturers of economizing devices. For example, manufacturers of soot cleaners tell prospects that by installing a soot cleaner they can reduce the

chimney gas temperature, claiming that every 13 degrees reduction of temperature means about 1 per cent of fuel saved. Of course, as my correspondent points out, the saving does not take place until "after" the soot is removed. In the same way the saving with scale removers takes place only "after" the scale is removed and upon keeping the scale out of the boiler. The same applies also to feed water heaters, water preheaters, air preheaters, superheaters, and all other economizing equipment.

The other correspondent said that he believed it would be "more logical and simple to base the chart on the thickness of scale rather than on the quantity of scale removed."

To this my reply is, "How are you going to measure the thickness?" Besides, there is more joy in weighing scale that is OUT of a boiler than measuring scale that is still IN the boiler. "A bird in the hand is worth two in the bush." To go all around the inside of a boiler measuring scale thickness would be a very difficult task indeed. Surely it is easier to weigh scale after it is out than to measure its thickness while it is still in.

The Boomerang Steam Meter

AN ENGINEER who knows more about steam flow meters than anyone else, said this not long ago: "It may prove highly profitable to buy a steam flow meter in order to learn that it doesn't pay to USE a steam flow meter. For example, if you are using considerable steam in a department and are not sure about the profitableness of the steam, I would install a steam flow meter, find out, and if I learned positively that electrical operation would be better I would throw out all of the steam equipment, including the steam flow meter itself, and install electrical apparatus." Thus the steam flow meter would prove to be a boomerang (by eliminating itself). But, isn't that the proper way? That is what the writer calls "good business."

A Useful Oil Weight Chart

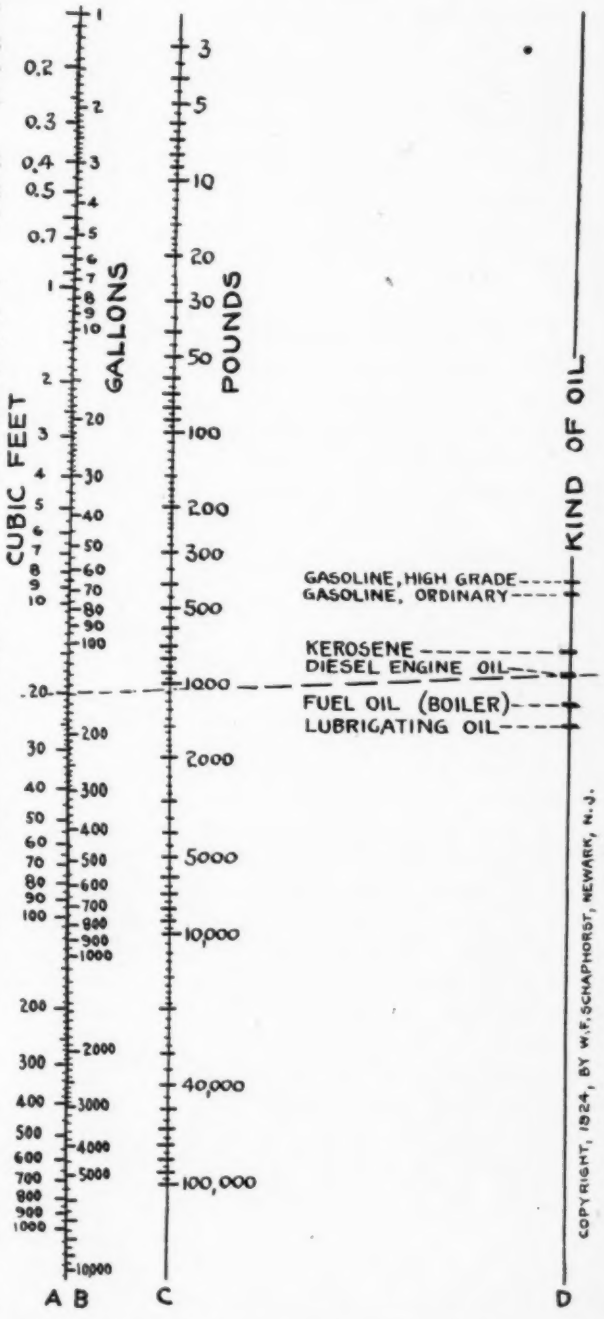
ON ACCOUNT of the considerable variation in weight of oils there is often confusion as to the number of pounds of the different kinds of oil in a given container. It is desirable to know the weight, because heat value is almost invariably given in B. T. U. per pound.

This chart will be found useful for quickly determining the weight of almost any number of cubic feet or number of gallons for any of the common oils: high grade or ordinary gasoline, kerosene, Diesel engine oil, fuel oil and lubricating oil.

For example, what is the weight of 20 cubic feet of Diesel engine oil?

The dotted line across the chart shows how the problem is solved. Connect the 20 in Column A with the point in Column G corresponding with Diesel engine oil, add the intersection with Column C, gives the weight as about 1,006 pounds.

If the quantity of oil is given in gallons, use Col-



umn B instead of Column A. Thus Columns A-B can be used as a conversion scale. For example:

Twenty cubic feet is equivalent almost to 150 gallons; 1,000 cubic feet is equivalent to 7,500 gallons, etc.

Inversely if the number of pounds is known and the kind of oil is known, a line through the known

points gives us an intersection in Columns A-B which tells the volume.

For those who prefer to make computations in longhand or on a slide rule this chart is based on the following weights per gallon:

Gasoline, high grade	6.00 lbs. per gal.
Gasoline, ordinary	6.12 lbs. per gal.
Kerosene	6.81 lbs. per gal.
Diesel engine oil	7.09 lbs. per gal.
Fuel oil	7.50 lbs. per gal.
Lubricating oil	7.78 lbs. per gal.

The range of the chart is great enough to take care of most problems. The weight, as will be noticed, covers all quantities between 3 pounds and 100,000 pounds.

Boiler Scale Removal

THE writer is informed that a prominent paper mill in Little Falls, N. Y., had their fireman, engineer, general manager and insurance inspector report on their boilers. Unanimously they reported them "clean"—that is, they were considered "free from scale." However, they were prevailed upon by a tube cleaner salesman to try out a tube cleaner and were surprised to find, after using the cleaner, that the "clean" boiler contained 400 pounds of scale at the very time when it was pronounced clean.

According to the chart which was published in the February PAPER INDUSTRY on the cost of scale, it will be found that 400 pounds of scale per month is equivalent to a loss of over $400 per year when the cost of coal is $7 per ton. It pays to keep boilers scrupulously clean.

Leather Belts Are Being Improved

NOT so long ago leather belts were not waterproof at all. Leather was then thought to be destructible by water, and, unless properly tanned or treated, it is destructible. Perhaps you can remember many instances of belts being actually destroyed by wetting. This destruction was unnecessary.

Manufacturers and users, working in harmony, are learning more about belts every day. In 1886 Mr. Lewis, who did much experimenting with belts prior to that time, concluded, "There is still need for more light on the subject." In a discussion on belts in 1909, Mr. Barth, A. S. M. E., page 89, said the same thing. There is still much more to know, but according to present indications belt manufacturers are rapidly approaching an ideal belt insofar as waterproofing, steamproofing, pliability, strength and durability are concerned.

Even though a belt is not to be used in a damp place, it is well to get one that is waterproof as a protection against possible atmospheric changes.

The foremost manufacturers of today are very choice in the selection of their hides—only the best part of extra heavy butts is used, and over 90 per cent of the hide's tan is discarded as unfit. Whenever it is found that the animal's hide is affected by sores or disease, that hide is not used, because its use would impair the strength of the belt.

The modern method of tanning leaves the leather in a nice, soft, flexible condition, which is of great value in any belt because there is less internal resistance offered to bending, and the belt is not liable to slip because it can more readily grip the pulley. Thus the pulling contact is ideal.

This belting being so unusually well selected and made is much stronger and tougher than was the "old-fashioned" leather, and even if modern belting were not waterproofed it would be correspondingly longer lived than that used by our fathers. The additional waterproofing is bound to greatly increase the life of a leather belt. Oak tanned belts, in the "old days," were usually disagreeably stiff and unwieldy. Modern belts are pliable. The "old" variety stretched quickly and had to be retightened often. Modern belts are given their initial stretch before they leave the factory, and yet we frequently hear belt users say, "Ah, but they sure knew how to make leather belts in the OLD DAYS." Old days, BAH!

Burn All the Coal?

I HAVE before me an advertisement containing this heading: "The way to save coal is to burn all the coal."

While this may sound like good reasoning it nevertheless is misleading and incorrect. It is possible to burn every atom of the coal and yet waste 100 per cent of it.

If, for example, a boiler is so thickly coated with scale on the inside and covered with such a thick coating of soot on the outside that heat will not penetrate, you can burn 100 per cent of your coal and waste every bit of it.

Furthermore, if the steam lines are not properly insulated, if there are a great many steam leaks, if too much air is used in combustion, if the boiler setting leaks, etc., it is very evident that burning ALL the coal is not going to help much.

The point I wish to drive home is that all factors must be considered, not only the single factor of burning ALL of the coal.

Bosses Were Wise

The heads of a big manufacturing plant had this notice posted at the beginning of the summer season:

NEW RULE FOR OUR EMPLOYES

All requests for leave of absence on account of toothache, severe colds, and minor physical ailments, and on account of church picnics, weddings and funerals and the like, must be handed to the foreman in charge of your department before 10 a. m. on the morning of the game.—Houston.

Cost and Factory Accounting

Part II

By H. M. GRASSELT
American Writing Paper Company

THE practical application of predetermined cost standards, as outlined in a preceding chapter, necessitates their occasional revision for the purpose of meeting the requirements of changing economical conditions. In times of stable industrial activities, revisions will be few since the basic components of cost standards—materials, labor and overhead—do not change substantially in such periods. The past few years with their unprecedented fluctuations in prices and wages rendered the application as well as the practical value of predetermined cost standards rather difficult, if not problematical. Only frequent, systematical revisions during that period brought results obtained through the use of cost standards within close proximity to actual costs. However, present indications are that the paper and allied industries approach an era of stability in which the application of cost standards will prove to be invaluable to sound management.

Predetermined cost standards are not new by any means, for some fifteen years ago Mr. Harrington Emerson, eminent pioneer in cost accounting and industrial engineering, wrote in the Engineering Magazine of .... "two radically different methods of obtaining costs: the first to ascertain them after the work is completed; the second method, to ascertain them before the work is undertaken..... The second method is the new one, beginning to be used in some large plants where its feasibility and practical value have already been demonstrated....."

Today, cost standards are used in the large plant as well as in the mill with just one small paper machine with equally gratifying results.

Briefness and immediate availableness of actual results at the end of a cost period is one of the prime prerequisites to an effective cost system. Since actual results must be compared to predetermined standards in order to speedily investigate discrepancies and adopt corrective measures to prevent repetitions, only a system that permits of prompt compilation of records and summaries is of decisive value to the manufacturer. It is obvious, that unfavorable conditions must be corrected immediately and not after weeks or even months.

As stated in part one of this series, material, labor and factory overhead make up the factory cost of the product. Prices of materials depend on market conditions, economical buying and competent handling. Expenditures for materials are readily determined and controlled and offer no great difficulties relative to cost work. The value of an efficient control of materials, work in process and finished products has repeatedly been discussed in the columns of THE PAPER INDUSTRY, and it has been pointed out that only an adequate control of materials will render a cost system complete and accurate.

Without going into details about the routine of material control and perpetual inventories, the following points will illustrate their importance and value in:

1—Keeping the investment in inventories at a minimum without running the risk of interruption of production on account of lack of materials.

2—Quick turn-over of materials and prevention of accumulation of obsolete stock.

3—Facilitation of taking physical inventories and representing a means to a definite check on the accuracy of actual count and weight.

4—Systematical storage of materials, elimination of waste of time in locating materials when needed and insurance against theft and willful waste.

5—Representing complete and ever-ready statements for the Purchasing Agent and Superintendent, and

6—Constituting valuable records in cases of fire.

A perpetual paper inventory has similar merits. It is, further, helpful in keeping promises to customers and, therefore, indispensable to the sales department; it facilitates the arrangement of economical runs and shows the turn-over of stock lines without the trouble and expense of taking a physical inventory.

The cost of labor is the next important item in the ultimate cost of the product. No management can afford to have an inefficient organization. Not the cheap, floating labor increases production, but the skilled, loyal and steady workman. Excessive labor turn-over is detrimental to the progress of any industrial enterprise and its reduction means a step toward lower production costs. A well-planned and effective inter-factory transportation system, co-ordination of processes with respect to the flow of work is another factor in the reduction of labor costs and an aid to increased production.

Labor costs are controlled through an adequate timekeeping and payroll system. The arrangement of the payroll should be in accordance with the departmentalization of the plant, so that a correct distribution of labor costs may be effectuated without going into laborious analysis of individual operations.

It should be furthermore borne in mind, that a cost system will be wanting in effectiveness if the active spirit of co-operation is missing in the mill. It may

be a rather hard task to introduce a cost system and solve the problem of getting the required forms made out. However, educational work, get-togethers of cost men and superintendents and foremen and adoption of an easily understandable system will bring results in every respect.

Labor and factory overhead expenses constitute the conversion cost. Power and steam and their distribution are among the most important items of conversion cost and will be treated in the following chapter, while other items, such as supplies, fixed charges, etc., will be explained later.

Power and Steam Distribution

Most industrial enterprises treat the boiler house and power plant as independent units in cost accounting. As such, these units are expected to make a profit. It seems that there is no uniform method of keeping power and steam costs in use in the paper and allied industries, though systems used in the various mills may be based on the very same fundamental principles. It is evident that the system must suit the conditions and furnish statistics of all activities for regular comparison. The forms for collecting of data must provide a means of checking up of performances and represent an index of the economical condition of the plant. Summaries must be promptly available and their totals represent accurate figures for the apportionment of power and steam charges to the various departments and processes.

Like factory costs, power and steam plant operating expenses are made up of materials, labor and overhead. Fuel—the prime factor—its cost, handling and treatment requires special attention. The storage of coal is an all-important factor in power plant economics. Coal that is subject to combustion is best stored in small piles, and bins and bunkers in boiler houses should be divided into compartments. This way of storing coal exposes a large percentage of fuel to the cooling effect of the air and thus lessens the danger of combustion. In case of fire only a small area is effected and the fire easily controlled. The temperature of the coal pile should be taken at certain intervals. To make tests, iron pipes are inserted into the coal pile at different points and a thermometer is inserted to read the temperature. Of course, it is necessary to cap these iron pipes at the bottom, since otherwise they would produce draft and aid combustion.

Handling of coal receives at present more thought and consideration than ever before, because of the high cost of labor. Methods of mechanical handling, conveyors, stokers, etc., should be provided according to lay-out and requirements. Local needs must be analyzed, as it may happen, that a power plant is operated more economical in the old, primitive method of hand firing and wheelbarrow than with an array of modern devices. Coal and ashes must be weighed for the purpose of obtaining a test on the quality of coal and data for cost records.

Steam and power plant are really the domain of the chief engineer, and he is the one who must have their economical condition at heart. As plant economics and cost accounting are so closely interwoven and correlated, an attempt has been made at pointing out a few features that have a decisive bearing on power costs and to suggest an amicable co-operation between engineer and cost department for the benefit of the whole enterprise. Efficient boiler house methods mean a considerable reduction in expenditures that will favorably reflect in the ultimate cost of the product.

The distribution of steam and power to the various departments and processes represents a rather difficult problem. A definite method, based on past performances and records must be adopted and each factor treated according to existing conditions. It is necessary to find a common basis of comparison between coal used and the results obtained. The basis for distribution is the total power house cost, which includes every item of power operating expenses (cost of fuel, labor, repairs, supplies, supervision, taxes, depreciation, etc). Unit rates for power and steam consumption have to be established, tests and comparisons made frequently for the purpose of verifying their accuracy.

The interspersed specimen of a monthly steam and power distribution sheet is self-explanatory. It will be observed, that columns are provided for entries of power, live steam and heating, so that at the close of a cost period each process and department may be assessed in proportion to the actual consumption.

Steam is consumed in (1) heating of buildings; (2) generating of power and (3) process departments. The steam required for heating purposes is to be estimated and charged to building expenses. Process departments and units are to be charged with steam at a cost per one thousand pounds on the basis of estimated consumption per hour operation. The cost per thousand pounds is determined by dividing the total cost of operating the steam plant by the weight of water evaporated. Meters will give exact figures for the distribution. If no apparatus is provided, the evaporation must be based on the quantity of coal used. Of course, difficulties will be encountered in the distribution of steam to the various units. Many mills heat the water used in washers with steam, use steam in making paste, steam in lofts, supercalenders, etc. Paper machines consume large quantities of steam, and here special attention must be paid to the question of exhaust steam for the driers. It is evident that exhaust steam cannot be charged as live steam.

Power consumption is calculated by extending the number of hours each power consuming unit operates by the horse power required to operate that specific unit. The horse power hours of power con-

sumed, thus secured for each power consuming unit, divided into the total cost of the power plant, gives the cost of power per horse power hour. The resultant cost per horse power hour is then used in the apportionment of power charges to the various units. Although much power is lost in carrying the friction load of transmissions and line shafts and other non-producing equipment, power cost is distributed solely over the productive horse powers consumed.

Power and Steam Distribution

Month of ....., 1924

Department	Floor Space %	Power				Steam, used in process				Steam used for Heating			
		H. P.	Oper. Hrs.	H. P. Hrs.	%	Lbs. per Hr.	Oper. Hrs.	Lbs. Total	%	Lbs. per Hr.	Hrs.	Fac. Total Lbs.	%
Rag Processing													
Bleach Boilers													
1000 # Washers (6)													
1400 # Beaters (12)													
Paper Mach. 84"													
Paper Mach. 102"													
Loft													
Calenders (8)													
Cutters 3—90"													
Sheet Paster													
Roll Paster													
Steam for Paste													
Platers (6)													
General Finishing													
Building Light													
Repair Shop													
General Plant													

Total Lbs. Coal.....
Evaporation.....
Total Lbs. Steam.....
Total.....

DISTRIBUTION
Est. %
Power.....
Processing.....
Heating.....
Total.....

As stated before, the problem of power and steam distribution is a difficult and complex one. The fact, that very often the very same boiler supplies steam for heating and power generating emphasizes the complexity of the problem. Even if a general factor for appropriate apportionment of steam and power costs has been found, the results must be constantly compared and checked. A close co-operation between engineer and cost accountant may result in obtaining satisfactory and accurate figures on these costs and their proportionate just distribution.

Curious Things About Memory

NOBODY knows how memory works, but we all know that it is simply the power to preserve certain impressions in the mind and to recall them later. A good memory is one that takes clear, strong impressions, and retains them. The difference between a good and a poor memory seems to be in the strength of the first impression. If this is clear and strong, it will remain; otherwise it will not. In other words, if a man's memory is good in the early part of his life and less retentive in the latter part, he will continue to remember the impressions that were made during his early years even though his memory fails later. It is largely a question of the strength and clearness of first impressions.

Memory is usually the strongest in the latter years of childhood, and from then on it diminishes gradually until the end of life. It is better when the general health is good than in periods of sickness and poor health. Most people have a good memory for certain things and a poor memory for others.

For instance, a certain man originally had a very good memory for forms of expressions, and a very poor memory for definite facts, dates, names, etc. He found that this could be partly remedied by giving special heed to every fact, date, or name that came to his attention and that he wished to remember.

For remembering names he has a special plan which seems to be a great help. He carries with him a notebook, and whenever he has difficulty in recalling a name he takes pains to look it up or find out by inquiry what it is. He immediately enters it in the notebook. The book is divided into sections as follows:

1—Actors.
2—Authors.
3—Geographical names.
4—Historical and literary names.
5—Institutions.
6—Miscellaneous acquaintances.
7—Miscellaneous celebrities.
8—Miscellaneous names in general.

Whenever he enters a name in one of these sections, he reviews all the names previously entered in the section.

He finds that by using this system he can usually recall the name when needed, even though it was originally a name that he had difficulty in remembering. For instance, he was once greatly interested in the history of the French Revolution but found it impossible to remember the name of Mirabeau. Now that he has the name entered in his list, it comes to him immediately without effort whenever wanted.

A mile a minute is pretty good speed; but a smile a minute gets more business.

Editorial Comment

By WILLIAM SIBLEY

The Passing of the Small Town

THE writer spent the majority of his youth in rural communities, not exceeding 500 in population. Much of the time he lived in "towns" small enough to permit one to stand in the geometric center of the village and see open farm land two blocks distant in every direction. Such towns boasted a population of about 100 souls, not counting dogs.

In the old days those little villages were real servants to their respective communities. Dotting the maps every six or eight miles, they afforded the farmer a trading point. It was here he marketed his grain, stock and produce, in turn purchasing 90 per cent of his needs from the local merchants.

It is this class of village that is rapidly passing into extinction via the automobile.

With horse and buggy, or team and wagon, six miles an hour was the maximum rate of travel. And to make the trip to town usually meant the expenditure of a half-day for even nearby farmers. Today, the automobile and light truck is standard equipage on farms. And the same hour formerly spent in traveling six miles now carries the farmer 30 miles.

With the result that the farmer can (and does) skip right through the little town with its limited facilities and visit the county seat in the same half-day's time. This means loss to the village store keeper—gain for the county seat merchant.

Ten years ago, the small town rural market absorbed 21½ per cent of the total retail business in the United States. Today these same stores are absorbing approximately 14 per cent. A loss of one-third in ten years. In 1890 the rural population equaled 64.6 per cent of the country's whole. In 1920 it stood at 48.6 per cent. A loss of 25 per cent in forty years.

Perfecting an Idea

IF the present day intensity of electric lighting were obtained by using the old carbon lamp of 1892, the cost of electric lighting in 1922 would have been increased one and one-half billions of dollars and there would have been required an additional twenty-five millions of tons of coal to generate the current required.

That is what the perfection of one idea did for the country.

The intensity of research in the electrical field, the rapidity with which inventions are being brought forward and the fervor of engineering investigations in this science are far ahead of the appreciation of the general public.

The development of our mechanical resources has become too rapid for true assimilation on the part of the human mind. Only a few hundred years ago, the average man understood the processes involved in the fabrication of life's necessities. Now, it is impossible for any one man to know all the processes involved in the manufacture of what we term "necessities."

It is becoming commonplace practice to accept results unquestioningly—without thought or care as to how the thing came about or how it works. There probably is no danger in this practice—except as it applies to government.

Peace and Pacifism

THERE is a distinction and a difference between being one who wants universal peace and being a pacifist. To have a sincere desire for universal peace is a great and good thing. It is the high ideal of a humanitarian. Probably the ones who dislike war most are the men who must carry the guns and do the dirty work. Everyone loves peace. No one wants war. Let someone mount a soapbox and advocate war for war's sake and he would promptly find himself confined in an asylum. No one asks another to relinquish his desire for or love of peace.

But being a pacifist—that is quite another matter. The aim of the pacifist is disarmament—the rendering helpless of able bodied nations. And while such a method might conceivably be proper in centuries to come, the world is certainly not ready for it in this generation. Entirely too much hatred, greed and envy remain in the hearts of men to permit of disarmament.

There are over 300 separate and distinct pacifist organizations in the United States. And it is the business of forty or forty-five persons to get on the directorship, the executive boards, or in other positions of influence in each of these organizations, in order that the policies and methods of each group might be governed and controlled—from an inspired source. That inspired source is Moscow.

Perhaps what has taken place and what is going on can best be explained through an analogy. Thus:

A great many years ago a few people (women and ministers for the most part) began to work for prohibition—for the abolition of the saloon and

—— on Timely Subjects

liquor traffic. This movement spread, year by year, until a great many organizations had been formed and it had taken on a political significance. The few people who, years ago, started this movement, accomplished their aim—national prohibition.

Now just supposing—if—150 years ago, the distillers and brewers of this country had placed in every one of these temperance organizations from one to three representatives—placed them in the various groups as secretaries, presidents, vice-presidents, and so forth—in positions where they could direct each group as the inspired source (distillers and brewers) dictated—if that had been the case, how close do you suppose this country would have been to national prohibition today?

Well, that is exactly what is going on in every recognized pacifist organization today, not alone in this country but in several other countries. Either direct, paid representatives or people influenced by the Third Internationale are in positions of prominence and are directing the pacifist movement in the United States.

Is it a bit strange that Russia, with a total trained man power of over 5,500,000 men (U. S. statistics, November 1923) should be spending vast sums to promote pacifism in the United States when our total trained man power is 418,000 men—about 1/13th as great as that of Russia?

Cling to the ideal of peace. But don't be a pacifist. The United States must be adequately armed. The Citizen's Military Training Camps, the R. O. T. C., the Boy Scouts, the Camp Fire Girls, and kindred organizations, must carry on. This world has not yet reached the mental stage where disarmament is possible.

Experimental Failures

AT Drake, North Dakota, the state-owned flour mill has been closed "until market conditions warrant its re-opening."

Experiments in socialization, via the Non-Partisan League, are evidently no more successful than those conducted along the main line Third Internationale. Private ownership and individual enterprise make for efficient and profitable operation. Rarely does a State or Federal government succeed in conducting a commercial enterprise. And certainly, since the Main Line in Russia is off schedule, the Branch Line in North Dakota could hardly be expected to run on time.

Apportioning the Advertising Appropriation

ONLY recently the Engineering Advertiser's Association of Chicago sent a questionnaire to their members asking for unidentified, unsigned statements regarding their individual advertising appropriations, the salaries paid, the division of the various appropriations, etc. Thirty-nine answers were received. The analysis of these answers is interesting.

Totaling the 39 appropriations brings the sum of $2,851,394.00. Of this total 43.6%, or $1,324,493.00 is expended on trade journal or magazine advertising. Thirty-six and seven-tenths percent, or $1,048,365.00 is spent on direct mail advertising. Eight and three-tenths percent, or $242,032.00 is allotted to cover department salaries.

Dividing and classifying the 39 statements into groups: A—appropriations under $20,000; B—appropriations between $20,000 and $50,000; and C—appropriations over $50,000, shows that each group differs but slightly in the apportionments. The small advertiser, the average would indicate, spends a slightly higher percentage on direct mail than does the advertiser whose annual expenditure exceeds $50,000. On the whole, however, the average runs from 40 to 60 per cent on trade paper advertising and from 30 to 40 per cent on direct mail, with from 3 to 17 per cent for salaries.

In our humble opinion, the trade paper division might well be increased. The apportionment, of course, depends entirely upon the nature of the business and what the market is. But trade journals, if properly used, can be made a prolific source of good inquiries. Furthermore, it has the added value of "publicity" which is not usually accorded direct mail efforts.

They say a Scotchman can drink any given amount of whiskey.

Three hundred years ago it was not impossible for any one to acquire all the knowledge of the world. The advances we have since made make such an acquisition impossible. Hence our age of "specialists."

Degree insignia such as "A. M.," "Ph. D.," "D. D." "LL. D." etc., never cover up the "A. S. S."

Picture taken at the Forty-seventh Annual Banquet of the American Paper and Pulp Association, April 10, 1924, at the Waldorf-Astoria Hotel, New York City

The Forty-Seventh Annual Convention of the American Paper and Pulp Association

Held on April 7, 8, 9, 10, 1924 at the Waldorf-Astoria Hotel, New York

By Special Correspondent

IT was a great convention! It was a largely-attended, a strictly business-like and an interesting and constructive convention. And there is no doubt that it is going to benefit the industry.

The forty-seventh annual convention of the American Paper and Pulp Association at the Waldorf-Astoria Hotel, New York, from Monday to Thursday, inclusive, of this week, did not set any records as concerns the number of men in the industry who journeyed to this city to attend it. At the same time, the attendance was fully up to normal, if not better, and the constructive program arranged and the wholehearted enthusiasm with which the executive leaders of the pulp and paper industry joined in the conferences and meetings, and exchanged ideas and evolved plans made it positive that the effects of the yearly gathering of paper manufacturers will be felt in a beneficial manner throughout the entire industry.

This year's convention was strictly a business convention. Politics were left at home by all those members of the association who are interested in politics of any kind, and the officials of the association prepared a program which had Business with a big "B" as its keynote. As one prominent paper manufacturer, and, incidentally, a former president of the American Paper and Pulp Association, stated, this year's convention is going a far ways toward relieving the industry of many of its present ills, particularly, as this authority pointed out, the ills today are largely psychological and therefore can be easily and quickly cured with the practice of a little common sense and business acumen. The paper manufacturer in question asserted that demand for and consumption of paper of practically all kinds in the United States were at high levels at present, that most paper mills were operating on close to full production and readily shipping out their product, but that, because of a too keen desire for additional business and partly because of outside influences such as unfair importations of paper from Europe, prices of some kinds of paper had been forced to non-profitable levels. It was his contention that the annual convention in New York would go a long way toward eradicating this evil and placing the paper and pulp industry in the position where the profits accruing to producers would be in proportion to the present output of the industry.

There were two outstanding and important features of this year's convention. One was the reorganization of the official staff of the American Paper and Pulp Association, as suggested by the Special Committee appointed some time ago by President Stokes to look into this subject and whereby a new Executive Committee, elected by the association at its general meeting, takes the place of the former Executive Committee consisting of the presidents of the various associations allied with the American Paper and Pulp Association and the officials of the parent body.

The second feature was the discussion in various sessions of the problem arising from the importation of large quantities of paper into the United States under false classification and at non-competing prices, which have waged profound influence on the market for domestic paper in recent months.

Henry W. Stokes, of the York Haven Paper Company, Philadelphia, Pa., was re-elected president of the American Paper and Pulp Association for the ensuing year at the annual session of the association in the Waldorf-Astoria Hotel Thursday morning. Norman W. Wilson, of the Hammermill Paper Company, Erie, Pa., was re-elected Eastern vice-president, while Alex G. Gilman, of the Allied Paper Mills, Kalamazoo, Mich., was elected Western vice-president in place of Walter R. Randall, of the Champion Coated Paper Company, Hamilton, O., who requested that his name be withdrawn from nomination. Dr. Hugh P. Baker was again appointed Executive Secretary and Treasurer.

The following were elected to comprise a new Executive Committee: Philip Weston, of the Byron Weston Paper Company, Dalton, Mass.; Herman Elsas, of the Continental Bag and Paper Mills, New York City; Frank J. Sensenbrenner, of the Kimberly-Clark Company, Neenah, Wis.; W. F. Brunner, of the Paterson Parchment Paper Company, Passaic, N. J., and George M. Seaman, of the Seaman Paper Company and Eddy Paper Corp., Chicago.

This new Executive Committee, of which the elected officials of the association also are members, will take the place of the former Executive Committee composed of the presidents of the dozen or so organizations allied with the parent association. Its members represent different branches of the industry, as follows: Mr. Weston, the fine paper group; Mr. Elsas, the pulp and wrapping groups; Mr. Sensenbrenner, the book and news group; Mr. Brunner, the vegetable parchment group, and Mr. Seaman, the box board group.

President Henry W. Stokes presided at the general meeting. Immediately after opening the session, Mr. Stokes delivered his annual address. It follows:

Statement by President Stokes

For a long time to come, in the opinion of many men conversant with conditions in the paper industry and with general business conditions, the calendar year of 1923 will be regarded as a basic year, with which to compare conditions in the years to come.

The establishment of a new basis for comparison may have been responsible for some of the disconcerting conditions that have been experienced during the past year, but instead of discontent with the state of business, the paper industry should look forward with optimism based on the fact that at last the business of the nation and of this industry in particular has reached a stable basis.

It must be recognized that while prices have not been as satisfactory as the mills may have hoped, the production for 1923 was only a few thousand tons under the previous high production record of the industry. As has been said before in these columns, no business can be considered unprosperous in a year when its production totals have been practically of record breaking volume.

Fears of high profits and heavy demand may be pleasant to contemplate, but any such over-prosperity must be followed by the swing of the pendulum of business to a period of depression, and the period of normal activity is that in which, and in which only, the business man can dispassionately study his business status.

It is true that there are some uncertain elements existing at this time. First, the economists say the nation is facing a period of slowly decreasing prices, and this has had the reaction in the paper industry of a large volume of short order business, and not a large volume of large orders and heavy stocking of warehouses. This tendency has persisted in the face of increasing prices for raw materials for the finer papers, and an unchanged labor situation. It is questioned by many experts whether the view of the economists applies truly to the paper industry with its slowly but surely diminishing reserve of raw materials. Col. Greeley, chief of the United States Forest Service, in a recent magazine article, prophesies the day when paper consumption will be diminished with the higher cost of raw material, due in turn to the diminishing acreage of usable forest. The great fallacy today is to consider present prices in comparison to those obtained in 1914, as if that were a basic year; 1914 prices and the conditions under which they existed are past and gone. The new basic year for prices and the present conditions, which govern prices and which will long continue is 1923. Our gold reserve, European conditional labor supply, our industrial expansion and domestic consumption all make 1923 a normal year for price comparison for some time to come, and make any comparison with 1914, as unsound as it is dangerously misleading. Business must forget 1914 and think in terms of 1923.

The second cause of uncertainty is the political situation, not so much the fact that this is a presidential year, but the playing of politics at Washington on tax and other matters affecting business, and the tendency of the legislators to

sacrifice business and prosperity to partisan advantage.

The third difficulty is the importation of foreign papers, not in sufficient volume to disturb the market, but under such condition of unfair competition as psychologically to upset the market in which relatively small importations are pyramided by brokers into apparently large shipments.

In the face of such factors, it is truly remarkable that January and February paper production held up to the high record figures of a year ago, and estimates of car requirements for the first six months of the year by the big paper companies, made to the railroads, falling off from the previous high record of the first half of 1923. It is to be noted that in 1923, the first six months of business was above that for any similar period in the history of the industry. Only an unexpected change in conditions in the latter half of the year prevented 1923 from being a year of record breaking production in all grades.

January production as reported to the American Paper and Pulp Association was 17 per cent in excess of December, and February, following such a high production month, only fell off 3 per cent from January. All grades, even those showing the smallest degree of prosperity, are reporting high production.

It is proper to record, also that while the average was 3 per cent less than in January, newsprint with its great volume of production, showed a falling off of 9 per cent, indicating that other grades had an actual increase in February over January to compensate for this falling off.

In general, therefore, it can be stated that the paper industry can properly assume an attitude of confidence that present conditions, if there is any material change, will only change for the better with the steady increase of the nation's consumption of paper.

The President then called on Norman W. Wilson, Eastern vice-president of the association and chairman of the Special Committee to consider the finances and proposed reorganization of the association appointed by President Stokes, and Mr. Wilson rendered the following report:

Report of Vice-Pres. Wilson

Because of the chronic financial difficulties from which the Association has been suffering the past few years, and with the belief that these difficulties could be met by certain changes in form of organization, and in financing, the President of the Association, Mr. Henry W. Stokes, appointed the following Committee on December 4, 1923: Norman W. Wilson, Hammermill Paper Company, chairman; H. H. Ellerson, Albemarle Paper Manufacturing Company; Frank E. Taylor, Advertising Paper Mills; D. C. Everest, Marathon Paper Mills Company; C. R. McMillen, Union Bag and Paper Corporation.

The Committee has met in the Association offices, separately and in conjunction with meeting of the special Finance Committee, on the following dates: January 23, 1924, February 15, 1924, and March 25, 1924.

During these meetings there was full discussion of the present form of organization of the Association and the relation of the Association to its affiliated associations. It was found that discussion of the form of organization of American Paper and Pulp and its relation to affiliated associations could not be separated from the question of financing the Association. Therefore, the recommendations of the Committee cover both form of organization and methods of financing.

Form of Organization

It is recommended that there be no essential change in the form of the Association or in the relation of the Association to its affiliated associations. The Association can function most effectively by continuing as the federated organization of the paper industry, with other associations in the industry as affiliated associations.

To facilitate the work of the Association, however, it is recommended that the present Executive Committee, which is made up of the elected officers of the Association, the past presidents and the presidents of affiliated associations, be changed to an Advisory Council, which may meet at least once each year for discussion of the work of the association for the industry.

It is recommended also that there be an Executive Committee consisting of elected officers of the Association and five other executives in the industry, who shall be elected at the same time and in the same way as the president and vice-presidents of the Association. The president of the Association shall be chairman of the Executive Committee.

Activities of the American Paper and Pulp Association

It is recommended that the Association continue to function as in the past, for the protection, promotion and perpetuation of the paper industry of the United States.

It is recommended that the program for the Association's activities in 1924-25 feature the following:

1. **Representing the Industry**—Such activity is fundamental to the character of the Association. It means representing the industry at Washington, at various state capitols, in paper-making states, with other industries, and before the public.

2. **Statistics**—The statistical activities of the Association to cover general statistics for the entire paper industry, import and export reports, and such detailed statistical reports as may be needed. The Association to cooperate with affiliated associations and thus avoid duplicating the activities of those associations.

3. **Tariff and Import Service**—As the Association is organized to protect and promote the paper industry of the country, it must take a definite stand in tariff matters for the ultimate good of the entire industry.

Any activities which are necessitated by the tariff law or changes in it, must be carried on in such a way as to represent all groups of the industry, and for the upbuilding of the industry. Tariff service is in a sense an emergency service, which must at all times be guided by the Executive Committee of the Association.

The industry is meeting very difficult competition from foreign pulp and paper. The Association should continue its efforts to prevent the dumping of foreign pulp and paper on to the markets of this country, and the entrance of paper wrongly classified and undervalued.

4. **Emergency Service**—As the Association has been able, repeatedly in the past, to meet emergency needs in the industry, so it should continue to serve the entire industry and affiliated associations in such emergency matters as tariff, coal, pulpwood, casein, etc.

5. **Cost and Income Tax Service**—It is recommended that the Association be more active in developing cost education throughout the industry, and that the industry itself should support the Cost Association much more efficiently than at present. The work of the Cost Association of the Paper Industry, which is a separate organization, has been carefully analyzed, and it is believed that the Cost Association is doing work of vital importance to the industry along cost lines, and particularly in service to the industry on income tax matters.

It would tend toward both efficiency and economy were the Cost Association a cost section of the American Paper and Pulp Association, so that its cost and income tax service might be given to all members. This can be done only when and if the industry provides the necessary funds. Such an amalgamation is not contemplated at the present time.

6. **Legislation**—The Association should continue with even greater aggressiveness its protection of the industry from harmful legislation at Washington and in state legislatures, and should use its influence in furthering helpful legislation.

7. **Information**—The Association must of necessity serve the industry as a source of information relative to the industry here and abroad.

The limited funds assured the Association for 1924-25 makes it necessary to give up the Information Service, as it has been known during the past three years. The Committee has studied the activities of the Information Service carefully, however, and believes that these activities have been of great value to the entire industry. It recommends that the Association carry on limited information service as funds permit.

8. **Raw Material**—The Committee recommends that the Association continue even more aggressively its efforts to insure the industry a permanency of raw materials, such as rags, paper stock, pulpwood, etc.

During the past three years the Association has allocated certain sums of money annually for the support of the work of the Woodlands Section. Last year this amount was $2,000, which covered in part the salary of the Assistant Secretary. The proposed budget will not permit of the conitnued support of this work. It recommends, however, that the Association continue its general work through its regular force for the maintenance of a permanent supply of raw materials, and that the Woodlands Section be reorganized so as to give special association service to the manufacturers owning timberlands, logging operations, reforestation, etc.

9. **Meetings and Conferences**—In addition to carrying on its general work for the industry, in arranging for conventions and meetings, the Association is in a position to handle the general association and statistical work of such of its smaller affiliated associations as do not have paid secretaries,

at cost to the affiliated associations, thus maintaining the organizations of these associations for emergency action and unifying the general statistical activities of the industry.

10. **Arbitration**—It is recommended that the Association extend its service in arbitrating difficulties between the buyer and the seller, particularly for mills in the Unclassified Division of the Association, or for members of those affiliated associations which do not give direct arbitration service. The Association should not extend this service into groups where the service is already under way, unless specifically requested to do so.

Financing the Association

The American Paper and Pulp Association is a business organization, in existence to serve the paper industry in a practical businesslike way. The Committee believes that as the industry learns more of the character of service given by the Association, it will finance the Association so as to adequately meet the needs of the industry.

With an assured and known income which can be made the basis of annual budgets, the Association can give more effective service to the industry than has been possible in the past where income has been irregular and uncertain.

It is recommended that the Association continue as a federated organization with affiliated associations continuing as organization members on a nominal membership fee of from $100 to $300 per year. The Committee believes that such an arrangement will not change in any way the present harmonious relations which the Association has with its affiliated associations.

It is also recommended that the Association continue the plan inaugurated this year of going directly to the mills, both to those members of its affiliated associations and to its own individual unclassified members, for annual membership pledges, and that, based upon the pledged amount, the Executive Committee fix the budget for the following year at its last meeting in any fiscal year, prior to the year during which the budget will be effective.

Finally, it is recommended that the Secretary-Treasurer shall submit monthly full statements as to the financial condition and the activities of the Association to members of the Executive Committee.

NORMAN U. WILSON,
Chairman of Committee.

Submitted by the Committee to the Executive Committee of the Association in regular meeting on March 26, 1924, where full discussion was given. The Executive Committee accepted the report and requested the Chairman to present report for action at the Forty-seventh Annual Meeting on April 10, 1924.

HUGH P. BAKER, Secretary.

Following Mr. Wilson's report, President Stokes talked for a few minutes on the financial position of the association. He stated that a few months ago it was found the association had run into debt to the amount of $29,000, and that it deemed it necessary to appoint the Special Committee to look into the affairs of the organization, effect means whereby this debt could be cleared up and to suggest changes in the conduct of the association whereby it could be operated within its annual income. He said that this entire shortage had been made up through contributions amounting to $25,000 and the allocation of other funds sufficient to provide the difference; that the budget for the coming year had been reduced $7,000 from last year's budget, that the association had been put on a firm financial basis and that he felt sure it would not be found necessary to call on the members of additional contributions in the future. In fact, he added, the officials of the association were going to make it their bounden duty to see that the expenses of running the association were kept within the organization's income from membership fees.

Walter J. Raybold, chairman of the Special Finance Committee appointed to raise funds to wipe out the association's indebtedness, reported that the committee had secured $25,000 in special contributions from members, that this sum was contributed by 114 different companies and that the average amount subscribed by each company was $220.

President Stokes thereupon appointed a Nominating Committee, composed of Walter J. Raybold, chairman; G. Frank Merriam, Arthur B. Daniels, Alex G. Gilman, William F. Brunner and L. E. Nash, and this committee retired to decide on nominations to be presented for election to offices in the association.

Dr. Hugh P. Baker did not read his report as secretary but presented it in printed form in the association's bulletin. The annual report of Secretary Baker follows:

Report of the Secretary-Treasurer

The year ending March 31, 1924, has been one of very definite accomplishment for the Association. This accomplishment has been both along the line of increasingly effective service to the industry but particularly in the direction of changes which promise to put the Association onto a sound financial basis for the future.

The year in the industry has been one of somewhat difficult adjustment to changing economic conditions, and yet the close of the year brings the conclusion that 1923 was pretty nearly a normal year in the industry, in fact rather more normal than any year since 1914. If economists serving the business interests of the country are correct, the paper industry, like other great industries of the country, is facing a period of slowly declining prices during which competition at home and abroad will be exceedingly keen, probably making it necessary to do business on a narrower margin of profit. This will doubtless be a period in which the high cost mill or mine or factory will gradually find itself unable to meet competition with the low cost mill or factory.

It was emphasized in the report of the Secretary last year that if there is ever a time when a trade association should be of service to the manufacturer, it is in a period of difficult business adjustment. The past year's experience has proven this assertion in that the well organized associations have been giving more effective service to the groups which they represent, and the less well organized associations have felt keenly the demands of their membership for greater efficiency. There is a growing appreciation in industry that a well organized trade association stands for definite accomplishments in the industry which it serves, and further that the trade association is in fact a part of American industry and, therefore, must play an increasingly important part in the economic development of the country.

Possibly some of the associations in the paper industry and in some other industries have concluded hastily that business conditions warrant doing certain things that are generally recognized as activities that may lead to difficulties under the law. What a legitimate association may and may not do has been very clearly established, and there is no need today for either a secretary of a trade association or the members of that association pleading ignorance of what may be done under our present anti-trust legislation.

Service by the Association

There are two forms of service given by associations in the paper industry to their members. The first and most effective form is what is called Direct Service; such as statistical activity, holding of meetings, reports on traffic and transportation and the personal work of the secretary. The second form of service is the representation of the group which the Association serves with other groups in the industry or with other industries, the watching of helpful and harmful legislation which the Association is always in a position to work aggressively for and against, and finally the representation of the industry before the public.

American paper and pulp has been able to develop through closer and more harmonious work with affiliated associations, forms of very direct service to the paper industry. Some of the most important phases of this direct service are:

1—Monthly statistical summary of the paper industry.

2—Weekly statistical reports for groups not served by organized groups, or groups without a paid secretary.

3—Monthly statistical reports on imported pulp and paper.

4—Quarterly reports on pulpwood situation.

5—A printed monthly bulletin which in no sense competes with the trade papers, but rather takes the place of form letters of special mimeograph reports.

6—Reports on general economic conditions affecting the entire industry.

7—Special import service dealing with the difficult situation confronting the industry in the way of papers being imported under wrong classification and undervalued.

Emergency Service

Meeting emergency needs in the industry in the way of coal, pulpwood, casein, tariff, etc.

Meetings and Conferences

Arbitration

Assisting mills not served in this activity by affiliated associations in arbitrating difficulties between the buyer and the seller.

Indirect Service

1—Representing the industry—with other industries, with the government, and before the public.

2—Contacts of helpful character with the National Industrial Conference Board, Chamber of Commerce of the United States, Association of Wood-Using Industries, etc.

3—Contacts with foreign countries with purpose of keeping the industry informed on foreign conditions.

Committee Activities

Two years ago the policy was adopted of doing away with standing committees in the Association and their replacement by special committees to do a particular piece of work. The standing committees have been continued only as there seems to be a special work to be done during the year. This policy has proven to be a wise one, in that a standing committee that does not have regular work to do soon comes to feel that it is of little service, and that possibly if the committee is not active the Association, itself, is not active.

Probably the outstanding committee activity during the year has been the development of an Advisory Committee from the Paper Industry for the Department of Agriculture. This committee is made up of representative men from the entire industry, whether members of the Association or not, and during February held an exceedingly interesting meeting in Washington with Secretaries Hoover and Wallace.

The principal committee activity in the industry itself has been the formation of a Committee on Perpetuation of the Paper Industry of the United States, of which Mr. Henry W. Stokes, president of the Association, is chairman. This committee has been carrying on some exceedingly interesting work.

Woodlands Section

The Woodlands Section was organized in 1920 for the purpose of bringing together executives and their assistants having to do with woodlands. Since its organization the section has been able to provide the industry with accurate and timely statistics as to the wood situation, and it has increased the effectiveness of these statistics by graphs and charts. The section has as its purpose not only statistics but it is working to increase the efficiency of woods operations in the industry, to encourage the practice of forestry on timberland holdings, and to provide a medium for gathering and dissemination of information which will promote the permanency of the woods operations of the pulp and paper industry.

Wood is the raw material of a large part of the industry, and it is increasing important that we should have information of an accurate character as to available supplies of wood, both in this country and in Canada, and how to make these supplies permanent for the industry.

Mr. O. M. Porter, assistant secretary of the Association, has been secretary of the Woodlands Section and has developed this work very effectively. His report upon the work of the section for the year appears elsewhere in this bulletin.

Information Service

This service was organized in 1921 under a special fund contributed to the Association both by members and non-members. Warren B. Bullock, a trained newspaper man, was placed in charge and he has made this service of very distinct value to the industry, particularly during the past year.

The industry itself, other national industries and the public are coming to the Association as never before for information as to where various papers may be secured, how papers may be used for new purposes and many other questions. It is important that the industry should have some agency through which this information can be given out, keeping in mind, of course, always that information given is accurate and truly representative of conditions in the industry.

The limited funds assured the Association for 1923-24 makes it necessary to give up the information service. A special committee on Association Activities and Program, of which Mr. Norman W. Wilson is chairman, has studied the activities of the information service fully and believes that these activities have been of great value to the entire industry. Even with the necessity of discontinuing the information service this committee has recommended that the Association carry on an information service through regular association channels.

The Paper and Import Situation

In the report of the secretary for the year 1922, the tendency toward a difficult competitive siuation with foreign paper was referred to as follows:

"Great quantities of paper are being brought into this country under improper classification and, of course, to the detriment of the paper industry. The industry should have a man who understands thoroughly the importation of paper who could keep close touch with the larger ports to see that paper is brought in under right classification, and secure information as to importations. Such work cannot be done with the present force of the Association."

In the report of the secretary for 1923 reference was again made to the need for an aggressive import service as follows:

"A very important piece of work could be done for the industry by the Association having in its employ a man who understands thoroughly the importation of pulp and paper. Every time that a shipment of paper is brought into this country undervalued or wrongly classified it injures the industry. No one can estimate the amount of paper that is being brought in and wrongly classified and undervalued. The Association is keeping in as close touch as it can with customs officials at the port of New York and elsewhere, and the specific cases which the customs officials of New York have brought to the attention of the Association in the past six months are clearly indicative of the very great help which could be given the entire industry if this work could be handled in a more effective way. Furthermore, such a man could keep the industry thoroughly informed as to the pulp coming into this country, how much is in warehouses, etc. The value of this information does not need to be enlarged upon—your secretary is so convinced of the necessity of service along these lines that he will continue to emphasize them in the hope that eventually such service may be given—and the wonder will be then that the service was not given before."

The Association has been keeping this import situation before its membership for more than two years, not only through annual reports of the secretary but through repeated form letters and in the monthly bulletin of the Association. Your secretary has appeared before regular meetings of the larger affiliated associations to explain the situation and emphasize the necessity for action. Finally, in November, 1923, after repeated efforts to get accurate information by letter, a conference of manufacturers was called at the Waldorf-Astoria. At the conference some 20 odd mills were represented and the situation was fully discussed and a resolution was passed urging the continuance of the work.

The difficulty all the way along has been that our manufacturers as a whole have not appreciated the emergency conditions which might arise from the constant bringing in of these foreign papers. Complaints have been so general that it has been impossible to take different cases to the government officials concerned. There has been large correspondence carried on in an attempt to get specific evidence of papers wrongly classified and undervalued but too often without success.

After a great deal of work certain cases were taken to Washington, but with little or no direct action because of the lack of evidence that such competition was actually injuring individual manufacturers within the industry.

If we are facing a period of declining prices with keener competition and lower margins of profit, there is greater necessity than ever that the Association work more aggressively in meeting this situation.

The Salesmen's Association of the Paper Industry has emphasized the situation through advertisements in the trade press and at their annual meeting just completed. Out of the agitation and work of this Association for the past two years and with the interest aroused by the work of the Salesmen's Association, it should not be necessary to continue to emphasize the necessity of action. There should be very definite action and that in a way that will meet the situation.

In presenting this situation during the past two years your Secretary has asked that the Association be given a customs expert to assist in the carrying on of the work. This same plan of action was presented before affiliated associations and at the November Conference. The situation became so difficult in January that your officers decided to temporarily give up the work of the Information Service and discontinue the monthly bulletin, and put all of Mr. Bullock's time into the import situation. Results achieved have proven the wisdom of this action. While Mr. Bullock is not a customs expert, his training as a newspaper man makes him of great value in securing needed information. As there has come necessity for technical assistance in the determination of papers, etc., he has gone to Mr. W. G. MacNaughton, Secretary of the Technical Association of the Pulp and Paper Industry, a technical man who has given very valuable assistance and who is ready to continue this assistance.

Your secretary recommends that the work which the Association has been doing the past two years be strengthened at once by the addition of a customs expert. With the Association machinery already functioning and with the experience which the Association has already had, it seems that the results desired could be achieved at the expense of a single customs expert. When need arises for special legal assistance this could be financed by the groups concerned.

Income Tax Activities

In the report of your Secretary in 1922 and again in 1923, the necessity for aggressive service to the industry along income tax lines was emphasized. Last year your Secretary urged the retention by the industry of an income tax expert. This suggestion was made because of the knowledge of what

other industries and other national associations are doing in meeting their income tax problems.

As in the case of the suggestion as to a customs expert, this suggestion as to an income tax expert was not considered of vital importance to the industry. Therefore, this Association urged the Cost Association of the Paper Industry to take up income tax work as a part of its service to the industry. That Association has been giving some very helpful service along income tax lines. The Cost Association should be supported much more generously by the industry, not only for the service which it may give along income tax lines but for the help which it can give in emphasizing the necessity for satisfactory cost work in the industry.

Contact with the Federal Government

Under this heading your Secretary has discussed in his reports of 1922 and 1923 the close contact which the Association is maintaining with various agencies of the federal government.

Last year it was stated: "It is safe to assume, and many of our manufacturers will assert as the result of more or less expensive experience, that the federal government is continuing with passing years to take greater cognizance of economic conditions generally and of the individual business of paper manufacturers, and all of the other manufacturers of the country. So long as this is the case it would appear to be wisdom for the industries generally to develop more effective co-operation as between the business men of the country and the federal government. To put it in another way, there are mighty few arguments against such co-operation."

Through the efforts of the Association the past four years to maintain the right contact with Washington, it is now generally appreciated among the government departments that this Association represents the industry, and when it speaks it speaks for the industry. This has been exceedingly helpful in getting the right consideration for the industry's problems at Washington.

Next Year

Your Secretary counts the past year and the year ahead better years as there comes greater opportunity for service and as he feels that the Association has made its work count for something in the upbuilding of the industry. As your secretary has become better acquainted with the industry and with the men making up the idustry, he has come to appreciate that there are much greater opportunities for service before the Association than in the past, and he hopes that it may be possible to make these greater opportunities for service the means of protecting, promoting and perpetuating the industry.

Last year in his report the secretary stated: "The fundamental need for the coming year is for a sounder and more effective method of financing this Association. If the Association is worth while it should be supported in a reasonably effective way, if it is not worth while the Association should be wiped off the slate and forgotten. The Association is worth while and three years of service with you has made me believe tremendously in the industry, if you men who make up the industry and in the Association itself."

The chronic financial difficulties of the Association finally came to a head in the early winter, just past, and your President, Mr. Stokes, took hold of the financial problem in a way that means a better Association.

Early last December the President appointed two Special Committees, one on Finance of which Mr. W. J. Raybold is Chairman and the other on Association Activities and Program, of which Mr. Norman W. Wilson is Chairman. Owing to the fact that there was a deficit when your secretary came into the Association in 1920 and the fact that most of his service with the Association has been during a period of business depression, it has made it exceedingly difficult to meet the increasing demands for service and at the same time get the Association onto a sound financial condition.

You will hear today that Mr. Raybold's Special Committee, with the aggressive assistance of Mr. Stokes and Mr. Norman W. Wilson, and in fact of every member of the Association, has been able to raise funds sufficient to put the Association square with the world. This seemed like an impossible task when it was approached in December, 1923, but hard work has accomplished the seemingly impossible task and the Association opened this fiscal year on April 1 without deficit or financial obligation of any kind.

Another phase of the difficult financial situation was the irregular and uncertain method of financing the Association. The report of the Special Committee on Association Activities and Program, which will be presented today by its Chairman, Mr. Norman W. Wilson, will indicate the thorough study which this Committee has made of the Association's problems and the solution proposed by that Committee, if accepted by you, will put the Association onto a sound financial basis. In fact the acceptance of this report means a turning point in the life of the Association of very great importance. With direct financial support by the individual mills and, therefore, direct financial responsibility for the Association, we should be able to go forward not only on a sounder financial basis, but on the basis of sounder and more effective service.

The fundamental need for the year 1924-25 in the work of the Association is for a better personal contact between the working force of the Association and its membership. Four years of effort to develop more direct service has gradually brought the secretary and his assistant into closer contact with the manufacturers. This contact should be carried still further, for only as there is a real working contact between the staff and the manufacturers can the Association know accurately the need of the industry and meet those needs as members of the Association feel that they should be met.

Limited funds may prevent the staff from spending as much time in the field as they should spend. The luncheons held in the different paper-making sections last year were very helpful and in the long run are less expensive than it would be for the secretary to spend enough time in any given section to meet the executives who would attend a luncheon in a group. These luncheons should be continued, that there may be discussion of the vital problems in the industry rather more than the problems of the Association.

There are other needs to be met in the work of the Association, but now that the financial burden has been lifted from the Association it should be possible for the Association staff to be more effective in all of their work.

Your Secretary appreciates more than he can express the solution of the financial problem of the Association, which has been carried through by President Stokes and Vice-President Wilson. It has been a privilege to work with these men during the past year. Few members of the Association appreciate the time and thought demanded of the officers of the Association. Mr. Stokes and Mr. Wilson particularly have met all of the demands of the Association in a fine generous spirit that has meant everything to those who are carrying forward the work of your Association here in New York.

The Association, after all, like any organization of men, is what the members make it. Your officers can but assist, and to repeat what has been said in previous reports, "How much that assistance (from the officers) will mean to the Association will depend largely upon the way in which you meet, not only the secretary, but your president and your Executive Committee in the work which they are trying to do for you."

Dr. Baker then announced he would not comment on his report as treasurer other than to say that the association was starting its new fiscal year "square with the world financially" and determined to keep within its income bounds during the coming year.

Secretary Baker then read the resolution pertaining to the import problem at the meeting of the Salesmen's Association of the Paper Industry and ordered transmitted to the parent association. (This resolution in full will be found in the report of the Salesmen's Association meeting on another page.) Dr. Baker referred to that part of his annual report as secretary touching on the work done by the association on the import matter, and read this excerpt from his report. He also submitted the following report prepared by Warren B. Bullock of the association staff, who has been devoting most of his time and effort in recent months to the import subject:

Bullock's Report on Import Matter

Investigations of abuses of the customs laws, carried on by the American Paper and Pulp Association for many months past, warrant the following summary of conditions as seen by officers of the Association:

1. Abuses of the laws have resulted in the bringing into this country of paper in such a manner as to cause a serious disturbance of the domestic market in many grades of paper.
2. The effects have been rather due to the psychological reaction to the broadcasting of offers of small quantities of paper at absurdly low prices than to any actual large quantity imports of such paper.
3. Pernicious activity of the importers is rendered more serious by the engaging of specialists from the customs department to serve the importers as counsel.

(a) Legislation should be sought to prevent any government official's retainer by outside interests for practice before any government bureau in which he has been employed within a period of two years.

(b) The industry should use its efforts to secure for the customs division of the Treasury Department such salaries and additional assistance as may make it

possible to keep in the government service these trained men of ability, and to give them sufficient assistance as they need to function most effectively.

Some of the Abuses Prevalent

4. Customs abuses involve the improper classification of foreign papers offered for import into this country, the dumping of foreign papers at less than the prices in the country of origin, and the criminal undervaluation of paper when it is brought into this country.

(a) Legislation is needed to make possible the collection of the proper duty upon paper which has been improperly classified, when it is found, after the fact of such importation, that the importers have successfully evaded the customs laws.

(b) Great difficulty is encountered under the provision that proof of injury must be presented by domestic manufacturers, before a ruling of dumping can be maintained. At present the customs authorities are forced to secure specific evidence of injury to individual manufacturers before a dumping ruling can be made; the successful sale of such "dumped" paper in competition with domestic manufacturers should be sufficient evidence of injury to American industry.

The details of the work done by the Association in its efforts to eliminate unfair competition from abroad would make an over-long report. It may be stated, however, that the investigations show that the importers are using the blanket provisions of the clauses providing duty-free entry of newsprint, and the clauses fixing duties on "printing" and wrapping papers as a cloak for constant efforts to get paper into the country improperly. In view of the widespread nature of these efforts, the customs service is to be complimented upon its vigilance in enforcing the collection of proper duties. The wonder is, not so much that much paper is coming in improperly, as that so many importations are caught and reclassified before they are offered in the domestic markets.

How Paper Is Mis-Classified

The chief abuses under the mis-classification headings are the efforts to bring in book paper as standard news, parchmentized paper (later marketed as parchment) as wrapping paper, typewriter paper as printing paper, and valuable special papers under the blanket clauses printing paper and wrapping paper.

The pending cases under the anti-dumping statute are chiefly on Canadian kraft, many shipments of which are now under investigation.

Under-valuation cases are handled directly by the customs authorities, through close contact with paper prices abroad.

The entire import situation involves highly complex problems, both of customs law and customs, and of technical character of paper being brought into this country.

As a result of the activities of the American Paper and Pulp Association, many importers who had been devoting every effort toward tricking the government agents are now more careful to enter their imports in conformity with the law.

It should be stated that many importers, men of high repute and honorable character, have been careful to conduct their foreign business in accordance with the spirit and the letter of the law. Others, however, less scrupulous, are no better than the bootleggers of "Rum Row," devoting every effort to swindle the government by evasion of the law, to the detriment of honest business. It is against this unfair competition that American industry is justified in conducting a relentless warfare.

Durgin Talks on Simplification of Paper

President Stokes, commenting on the import proposition, suggested that the subject be referred to the new incoming officers, for the appointment of a committee to consider the matter or to take such other action as deemed advisable.

D. A. Durgin, of the U. S. Department of Commerce, addressed the meeting on the subject of simplification and standardization of paper, and urged the paper industry to lend its support to the standardization program being promoted by the government. He stated that 189 of the 289 leading advertisers of the country had, within three weeks after being approached on the subject, endorsed the plan, that the Direct Mail Order Association, the United Typothetae of America and other organizations were behind the plan, and emphasized the advantages to be gained by the paper industry in supporting the standardization movement. Following his brief address a resolution was passed to the effect that it was the sense of the meeting that the industry should get behind the simplification program, the resolution being unanimously approved by a rising vote.

Then followed one of the usual features of the annual meeting of the American Paper and Pulp Association—the reviews of conditions in the several branches of the industry by men qualified to talk in an analytical way on the prevailing situation in the different kinds of paper. Only three talkers were on the program this year, but their matter-of-fact elucidations on those branches of the industry they are cognizant with were particularly interesting and instructive.

E. W. Kiefer, of the Port Huron Sulphite and Paper Company, Port Huron, Mich., gave the following talk on the pulp situation, which, in view of all the discussion of foreign competition in pulp and paper and the import problem as affecting the domestic industry, was especially timely and enlightening. Mr. Kiefer's talk follows in full:

E. W. Kiefer's Address on Pulp Situation

Seven years ago I happened to address you on the subject of Pulp and the expansion then taking place in industry and the effect it was likely to have, and it may be well to recall the situation at that time in an effort to properly evaluate the present.

Before the war domestic manufacturers were shipping 9,000 tons of bleached sulphite pulp, which they had increased in 1917 to 15,000 tons per month to take the place of the 6,000 tons per month previously received from Germany and Austria Hungary.

During the last year 1923 these countries had fully recovered their position in the American market by shipping 85,000 tons of unbleached and bleached chemical pulp against the same amount of 1912. In addition to this Norway has slightly increased her shipments from 82,000 to 87,000. Sweden has increased three-fold from 121,000 to 319,000, and Finland has made the astonishing jump from 4,000 tons to 102,000 tons, or the total importation from European countries has risen from 1,000 tons per day to 2,000 tons per day. Canada has gone from 53,000 tons to 777,000 tons, and our total importations have risen from 353,000 tons to 1,377,000 tons, nearly four times as much in the last ten years. While this has been taking place the production of American sulphite has remained stationary or slightly declined from 1,450,000 to 1,375,000 tons, and soda in about the same proportion from 437,000 tons to 419,000 tons. Kraft jumping from 85,000 to 243,000 tons, due mainly to the building of southern mills, which expansion is still going on at a rapid rate.

Now these statistics are interesting when analyzed, but in view of the fact that European imports of ground wood have risen from 4,000 tons to 65,000 tons, we may as well proceed directly to the point, and that is that European pulp wood will continue to come over in constantly increasing quantities in the shape of ground wood and chemical pulp and newsprint until the cost of wood at the mills in the two continents is approximately equal.

The traditional difference in labor cost will favor the European producer and become as in past years just about equal to his ocean freight. The cost of wood at the mills making their own pulp cannot exceed the European's price plus the freight of that pulp to the American mill.

Now what is that cost of wood and how are we to face the issue? I had the pleasure of recently being visited by the president of one of the large Baltic mills, who was quite frank about his operations.

His wood cost is equivalent to $9.00 per rough cord of 128 cu. ft. laid down at his mill. Now, inasmuch as his company has practiced forestry for some 40 years and has nearly 800,000 acres under its management, it seemed unlikely to him that his wood cost would change materially in years to come; in other words, this cost was a staple cost based on cost of raising, cutting, etc., and not as with us, constantly being driven upward by depletion of a natural resource.

In pre-war years the price of pulp wood was fairly steady at $6.75 per cord, averaging the rough and peeled, which has advanced to $10.50 on board cars or vessel at point of shipment, an advance of 55%, which is not much more than the advance of other commodities, but when we consider the rise of the cost of transportation due to various causes, but mainly that of greater distance, and when we see that the price at the mill has jumped from about $10.00 to $20.00, then the real significance of the European's staple price of $9.00 per cord at the mill is fully appreciated. It is plain to be seen that as long as the European has the advantage of $18.00 to $20.00 per ton on the manufactured pulp that this advantage is not to be offset by an ocean freight of some $5.00 plus to a rail freight of $7.00 per ton and that the American manufacturer cannot even afford to make pulp for himself much less sell it unless his wood cost is not over

$30.00 per ton of pulp, or he is making a very special product.

Not only has this situation practically stopped the manufacture of sulphite for sale, but there is great question whether it has not also stopped the growing of trees on this continent in competition with European forestry before ours has even gotten fairly started. Unless your woodlands are in your own back yard it would indeed be a brave man who would venture on a policy which would entail millions of dollars on an enterprise unprotected by any tariff and in competition with a strongly intrenched low cost competitor.

Gentlemen, I have devoted my time almost entirely to the pulp or pulpwood situation, as we should be a body of men entirely free from bias on this question, and above all not carried away by sentiment. Much as forestry is needed in this country, I see little hopes for its successful future in the face of the practical difficulties before it. When we enquire still further into the low price of European pulp wood we find additional reasons for it. They run sawmills in connection with their pulp plants, where every bit of waste is worked up, also wood charcoal and extracting plants to utilize the small stuff, the limbs being sold for faggots and firewood. Just where in this country, with our immense coal resources, there is any place for such economies is hard to see. So we may at once boldly come to the conclusion that wherever paper prices are based on our wood costs and not on European pulp they will not endure, and we must do what is necessary to set our house in order either by using imported pulps or by bringing our costs to an equivalent basis. So far, it seems that the tendency to do this has shown itself in the closing down of the smaller and weaker mills and the bonding of the larger ones in an attempt to provide sufficient capital to utilize lower operating costs. This, of course, tends to still further over-production; therefore and in conclusion, I wish to leave this thought with you, that only by intense specialization will the day be saved and a reasonable profit assured. Concentrate on as few lines as possible instead of as varied a product as possible. Make your name stand for the best there is in some one thing and it will bring you unsolicited business in that line. Equip your mill to make that grade that is the most advantageous, considering proximity of the market, the cheapness of the particular raw material required, and last but by no means least, train your force in the making of that one grade of paper until they are past masters of the art.

This will not only help to cut selling, distributing and manufacturing costs, but each cobbler sticking to his own last will prevent, to some extent the making of prices by the inexperienced and give a chance to those who devote themselves to a single line of paper from having to compete with the fellow who will quote on anything from Oxford Bible to newsprint on the same set of costs in an effort to keep his machines running when his own line is slack.

If, therefore, this industry, like some others which have achieved notable successes, can turn out a greater amount of production per man than the European, standardize its products and its machines until they are the world's best and emphasize specialization instead of diversity of product, then only may we hope to be ranked as one of the successful and valuable of American industries.

Coarse Paper Situation Covered by C. R. McMillan

C. R. McMillan, of the Union Bag and Paper Corporation, New York City, talked on the situation existing in the coarse paper industry. Mr. McMillan started by saying that he intended to present merely a birdseye view of the coarse paper conditions, that he had decided to omit statistics of production, shipments, consumption, etc., such as are usually found in summaries of trade conditions, and that he would endeavor to present his idea of why business in coarse paper at the present time is principally of unprofitable character.

He said that the paper industry was composed of a greater number of integral parts than, with one exception, any of the other 15 major industries of the country; that in the steel, electrical equipment, chemical and dye, rubber, tobacco, automotive and other principal industries it had been found, on investigation, that one to six companies represented more than 50 per cent of the total net worth of each industry, whereby latest available statistics of government origin showed, for example, that the coarse paper industry comprised 139 mills or companies producing wrapping paper, 38 producing bogus paper, 11 producing greaseproof paper and 5 producing parchment paper. He went further and stated that statistics showed there were 672 firms operating 683 paper and 332 pulp mills in the United States.

Mr. McMillan pointed out that with so large a number of individual units in the paper industry it was logical that competition should be exceedingly keen. Taking 125 wrapping paper mills as a basis, he estimated that each mill must have at least two executives who conduct the plant, thus making a total of 250 executives directing the wrapping paper industry. He said that obviously these 250 executives differed in intelligence, in ambition, in policy and in various other ways; also each mill or unit differed in capital, in cost, in overhead, in location and in other ways, thereby so greatly distributing the control of the industry that it stands to reason the paper industry is not operated as economically or with such sound judgment as other major industries. He closed his remarks by saying that the paper industry had failed to seek the knowledge necessary for its uplift and prosperity, and therefore is suffering.

Chas. McKernon Reviews Fine Paper Conditions

Charles McKernon, of the B. D. Rising Paper Company, Housatonic, Mass., reviewed briefly the prevailing conditions in the fine paper industry. He stated that the market for fine papers has improved since the first of the year and that the writing paper mills of the country are operating at 95 per cent of pre-war normal. He mentioned the high cost of raw materials, saying that rag prices have advanced 21 per cent since January 1, 1923, and that rag market levels were higher in March, 1924, than at any time since 1921. He also referred to the tremendous expansion of fine paper mills in recent years and declared it would require five to six years at least for the consumptive capacity of the nation to catch up with the productive facilities of the fine paper manufactories of the country. He added that the writing paper manufacturers had profited somewhat by the low prices of pulp, and that costs generally were about unchanged for the year.

President Stokes Re-elected

The Nominating Committee then presented its report and the election of officers for the ensuing year proceeded, the election being effected through the casting of a single vote by the secretary. President Stokes in a few words thanked the association members for his re-election and stated he hoped to justify in the forthcoming year the confidence imposed in him.

The resolutions adopted declared that as our forests are being depleted faster than new growth will replace the cut, and as the paper industry is largely dependent upon the forests for its raw material, the McNary-Clarke bills, now in Congress, be endorsed and their immediate passage urged, and the work of the Forest Service at its laboratory at Madison, Wis., and the experiment stations in papermaking regions be complimented.

Another resolution asked for early and prompt action on the tax problem, and a wise distribution of government appropriations.

The meeting thereupon was adjourned.

Annual Banquet

Almost a thousand paper manufacturers, mill agents, jobbers and guests attended the forty-seventh annual banquet of the American Paper and Pulp Association in the grand ballroom of the Waldorf-Astoria Hotel Thursday evening. Not only was the spacious dining room crowded with tables, with practically every chair occupied, but the entire lower tier of boxes was also filled with diners.

The ballroom was tastefully decorated with American flags. Behind the speakers' table, which was a long table extending almost the entire breadth of the room and elevated about two feet from the floor, were grouped American flags, some on staffs, while the tiers of boxes were draped with the national emblem. In honor of the speakers there were State flags of New York, New Jersey and Minnesota behind the speakers' table, while each table was decorated with ferns and cut flowers.

At the speakers' table were, besides the speakers of the evening, former presidents of the American Paper and Pulp Association, including Walter J. Raybold, of Housatonic, Mass.; George W. Sisson, Jr., of Potsdam, N. Y.; Arthur B. Daniels, of Adams, Mass.; Frank L. Moore, of Watertown, N. Y.; Arthur C. Hastings, of New York City; George W. Knowlton, of Watertown, N. Y., and A. G. Paine, of New York City. There were also the vice-presidents of the association, Norman W. Wilson, of Erie, Pa., and Alex G. Gilman, of Kalamazoo, Mich. Another notable of the paper industry at the speakers' table was Philip T. Dodge, president of the International Paper Company, of New York City.

President Henry W. Stokes presided as toastmaster and introduced the speakers. During the serving of dinner an orchestra played popular, old-time and semi-classical selections, and a song leader led the diners in singing the well-known songs.

Souvenirs of the dinner were Ever-Ready safety razors of the latest type, in nickel cases and elaborately packed in double fancy boxes.

The keynote of the convention of "Business Not Politics" was carried out in the selection of the speakers at the annual dinner. It has been the custom at the yearly banquets of paper manufacturers to have a United States Senator as the principal speaker, but this year the order of things was changed and the speakers were Julius H. Barnes, president of the Chamber of Commerce of the United States; Frederick P. Fish, chairman of the National Industrial Conference Board, and the Rev. Dr. W. Warren Giles.

Mr. Barnes spoke of the tremendous progress made by American industry in the last two generations, emphasizing to what extent labor has been displaced by the development of new and improved machinery.

Mr. Fish spoke at length on the part trade associations should play in the political as well as business activities of the nation, outlining the good they could perform by proper co-operation with Government officials. He urged business men to realize their obligations to their communities as well as to their individual business, and stated they should recognize their power and make use of same in shaping our national political affairs. He touched on labor, and stated that employers were largely to blame for unemployment when it occurs because they are too eager to expand their production and press business in good times and therefore were obliged to curtail operations when business slows down. This situation, he declared, should be remedied by the business men of the country so that the upheavals of industry could be avoided.

He appealed for the co-operation of the paper manufacturers with the National Industrial Conference Board, saying that the Board was a business organization serving the business men of the country. He also alluded to the numerous laws dealing with business, and expressed the opinion that most of the anti-trust legislation and the trade commissions were a detriment rather than an aid to industry.

The Rev. Dr. Giles spoke largely in an humorous vein, and his talk was much of a relief after the very serious speeches of the two preceding speakers. Dr. Giles put in several "wallops" on the other two speakers, and after telling several humorous yarns, declared that what was needed for a return to rehabilitation and readjustment was a return to the ideals of our parents, and to things spiritual. He said that after all what counted was not statistics, nor personal ambition or gain, but the good in each human breast and that fellowship of man exemplified by the Saviour.

Permanent Memorial Proposed

The establishment of a permanent memorial to the paper industry was proposed at the luncheon given by Henry W. Stokes, president of the American Paper and Pulp Association, to former presidents of the association following the general meeting of that organization on Thursday. All the living former presidents of the association with one exception were present.

The proposed memorial contemplates the erection of a monument in Fairmont Park in Philadelphia on the site of the Rittenhouse Paper Mill, the first paper mill in America. The site of this mill is now within the Philadelphia park, and the park authorities have informally expressed approval of the project.

Ninth Annual Meeting of the Technical Association

Held on April 7, 8, 9 and 10, 1924, at the Waldorf-Astoria Hotel, New York

OWARD S. TAYLOR, of Dayton, O., was re-elected president for the ensuing year of the Technical Association of the Pulp and Paper Industry at the annual meeting of that organization in the Waldorf-Astoria Hotel, New York, on April 9. Grellet N. Collins, of Dill & Collins Company, Philadelphia, was again elected vice-president, and William G. MacNaughton was re-elected secretary and treasurer.

Two new members of the Executive Committee were elected, namely, L. J. Parant, of the St. Croix Paper Company, Woodland, Me., and W. H. Byron Baker, of the York Haven Paper Company, York Haven, Pa., succeeding George H. Harvey, of the Gardner-Harvey Paper Company, Middletown, O., and George K. Spence, of the New York & Pennsylvania Company, Johnsonburg, Pa.

Revised Articles of Organization Adopted

At the business meeting of the organization it was decided to change the Articles of Organization of the Technical Association and the revised Articles were adopted.

Following this the various standing committees reported, and Austin Cary of the United States Forest Service made a highly interesting talk on the papermaking possibilities in the South.

The Technical Association meetings were largely attended. The Executive Committee of the Association opened the convention with a committee luncheon on Monday, April 7, at the Canadian Club in the Belmont Hotel, and Monday evening an informal smoker was given at the same club, at which the various committees conferred.

In his annual address opening the first formal meeting Tuesday morning, President Taylor reviewed the work of the association for the year, and also outlined plans for the forthcoming year. Secretary-Treasurer MacNaughton made his annual report, and Royal S. Kellogg reported for the Executive Committee.

At the afternoon session on Tuesday reports of the Committee on Waste, R. B. Wolf, chairman, and of the Committee on Paper Drying, F. R. Hyatt, chairman, were rendered, and there was a discussion of drying tests, and also a paper on "Vacuum Paper Drying," by Ogden Minton.

The Wednesday morning session was devoted to business, election of officers and reports from other committees, and the afternoon was given over to round-robin discussions on soda pulp, heat, light and power; coated and processed papers, materials and paper testing, and sulphite.

PAPER TESTING COMMITTEE REPORT

By F. A. Curtis, Chairman

A definite plan or program of work was arranged at the beginning of the year and the members of the committee asked to take part as follows:

1. Microscopic Analysis—H. N. Lee

Continue work of previous year and attempt to finish the corporative investigation and propose methods for adoption.

2. Greaseproof Papers—H. A. Smith

Develop suitable methods of testing greastproof paper.

3. Papers used in the electrical industry—A. L. Allen and A. T. Randall

Develop special tests for various insulating and cable wrapping purposes.

4. Coarse Boards—A. R. Harvey and M. C. Walsh

Develop tests that are suitable for the various types of coarse boards, with especial reference to box board.

I. Microscopic Analysis

The report of H. N. Lee appeared in the Paper Trade Journal under date of November 22, 1923, under the title of "Microscopical Analysis of Paper by Eighteen Investigators using Different Methods." As a result of this investigation, two methods are proposed to the Association for their consideration.

On the publication of the report by H. N. Lee, a mathematical study was made of the results by E. A. Bergholtz of the American Telephone & Telegraph Company and his paper is reprinted under the title "Comparison of the Various Methods Used in Determining the Fibre Content of Paper."

A method for differentiating between soda and sulphate pulp in paper has been developed by E. Parke Cameron of the Forest Products Laboratory of Canada and has been tested by several laboratories. Reports of this method are very favorable. The method is presented in reprinted form.

II. Grease Proof Paper

The report of H. A. Smith is presented in preprinted form under the title of "The Turpentine Penetration Test for Grease Proof Paper." Considerable work has been involved in the development of this test and the co-operating laboratories are to be congratulated on the results of their effort. It is believed that this proposed method will be of considerable value to the industry.

III. Papers Used in the Electrical Industry

Reports have been prepared by A. T. Randall and A. L. Allen, working independently, of qualities that are necessary for paper used in this industry and this work is to be continued and tests devleoped to determine these special qualities.

Contract has been maintained with H. H. Brown, a member of a sub-committee on Unimpregnated Insulating Paper of Committee D-9 on Insulating Materials of the American Society for Testing Materials. The physical and chemical tests proposed by this sub-committee seem somewhat more rigid than necessary for ordinary mill laboratory work. They include the usual tests with the addition of the following: Porosity, Apparent density, Acidity and Heat endurance.

The tests desired on insulating paper are as follows:

Moisture, thickness, tensile strength, tearing strength, bursting strength, folding, porosity, absorption, water rise, apparent density, fiber analysis, Metallic particles, heat endurance, acidity, ash, flexibility, dielectric strength and size.

Fish Paper

Of course, different insulating paper to be used for different applications should have different qualities. However, no one paper would have to be tested for all of the above named qualities.

For example, thickness, tearing strength, dielectric strength, and flexibility, also porosity are required on thin fish paper. Fish paper is a cotton paper treated with either zinc chloride or sulphuric acid.

Condenser Paper

On a condenser tissue our tests would be confined to fibre, thickness, and porosity.

Rope Paper

On rope paper we would usually test for metallic particles, tearing strength, porosity, absorption and thickness.

The Sub Committee on paper, of Committee D-9 of the A. S. T. M. has been working on a specification for tests of paper and has just about completed their tentative specification. At present they are trying out four methods including the Technical Association of the Pulp and Paper Industry method for acidity. They claim that their preliminary data revealed the inadequacy of the Technical Association of the Pulp and Paper Industry method of determing acidity of insulating papers. They say that the three remaining methods will be revised for further work on four samples to be tested by nine laboratories. They are collecting data on three machines for testing tensile strength with the view of describing a method that will permit the use of both machines. They are also collecting data on two instruments for the testing of porosity or air permeability, to ascertain the uniformity of results obtained with these two instruments. They are considering the two methods for fiber analysis now up to the Technical Association of the Pulp and Paper Industry for adoption, provided, of course, that the Technical Association of the Pulp and Paper Industry adopts these methods.

Practically all of the members of the A. S. T. M. Committee are users of electrical insulating paper and not manufacturers. I would think it very desirable for the manufacturer to seriously consider all of these tests named above and which will also be named in the A. S. T. M. specification.

IV. Coarse Boards

Although a detailed report of this part of the program is not available, it is planned to continue the project. There are few, if any, really satisfactory tests for coarse boards. Although a large portion of this product used does not require any special tests, the very great tonnage and the large percentage of total paper made warrants an investigation as to test methods. A report is expected in the near future from A. R. Harvey and M. C. Walsh.

Through the courtesy of B. W. Scribner, a number of abstracts of reports from the Paper Section of the Bureau of Standards have been made available for this meeting as follows:

1. The Detection of Animal Size in Surface Sized Papers by F. T. Carson.
2. Effect of the Weight of the Gauge Needle of the Mullen Paper Tester upon the Bursting Strength Test by C. J. Costello.
3. An Analysis of the Strength of Paper by F. T. Carson.
4. Comparison of Tensile Tester by Coleman J. Costello.
5. A Measure of the Color Characteristics of White Paper by R. E. Lofton.

V. Conclusion

Continued application to the development of paper testing methods is very desirable. It is hoped that the members of the Association will continue to lend their support to this work.

REPORT OF MATERIALS TESTING COMMITTEE

By Helen U. Kiely, Chairman

During the past year the Materials Testing Committee has assembled and had published for the first time standard methods covering the more common materials tested in the ordinary paper laboratory.

These methods are in all instances the practical commercial methods and are in daily use in many laboratories. While it is realized that these might not meet with the approval of the highly scientific, it was thought better to prepare such methods as would best suit the needs of the ordinary paper mill chemist. For college laboratories or for referee analysis a more detailed method might be more advisable.

This edition of the Materials Testing Methods is in no way complete or final. It is the hope of the Committee that from this first attempt many valuable criticisms and suggestions will be forthcoming and a more complete and improved edition printed.

The Committee will continue to assemble and check new methods during the year. It is hoped that a revised method for pulp testing may be developed, as there seems to be a growing need for a new method that may better approximate mill working conditions.

No data seems to be available on the testing of rags and it is also hoped that something may be worked up along this line.

If there are any particular methods which the members desire the committee to investigate they should be brought to the attention of the committee and consideration will be given them.

COMMITTEE ON COATED AND PROCESSED PAPERS

By Edwin Sutermeister, Chairman

At the meeting in April, 1923, it was decided that the work of the Committee on Coated and Processed Papers for the following year should include the two lines, Waxed Paper and Gummed Papers. It was thought that the work could be carried out best by organizing two subcommittees, and Raymond Hatch was asked to serve as chairman of the subcommittee on waxed papers, and Norman Clark of that on gummed papers.

Mr. Hatch made very careful inquiry among the manufacturers who were prominent in the waxed paper trade and found it impossible to persuade them to enter into questions of investigation or research in a co-operative way. He felt that any work done by the committee under such conditions would be done by one man and that the work would be accepted by all the rest of the industry without any reciprocal information. After considering the situation carefully it was thought best to abandon, temporarily at least, the attempt to carry on work along this line. This subcommittee was therefore allowed to die a natural death.

Mr. Clark appointed on his subcommittee George W. Sullivan of the Nashua Gummed and Coated Paper Company and George G. Richter of the Brown Company. Through a misunderstanding, Doctor Richter has done no work for this committee, nor taken any part in the carrying out of its program. Mr. Sullivan has prepared a paper on the effect of acetic acid on animal glue, and this paper will be read and discussed later.

Although not on Mr. Clark's committee J. O. Ross has ably seconded its efforts by preparing a paper on the drying of gummed papers. This will also be read and discussed at the sectional meeting.

During the year the question of a possible substitute for casein was brought up by a member of the Technical Association. This has aroused considerable interest in the industry and it has been attempted through correspondence to find out who was interested to the extent of supporting the necessary investigations financially. No definite plans have yet been made and opinion seems to be divided as to whether the work should be done by the Bureau of Standards, in which case the results would be free for all to use, or whether it would be better to have it done in a private laboratory so that the results would benefit only those who finance the undertaking.

The most important work carried out by the committee this year has been the preparation of the manuscript on Coated Papers for the textbooks. This work has been done almost entirely by Norman Clark.

For the coming year it would seem well to organize for the investigation of possible casein substitutes and push the work along as fast as possible, for at best it will probably be a rather long investigation. It is hoped that more work relating to gummed papers can be undertaken as this should be a fruitful field for research. Another subject which is proposed is the manufacture and use of satin white. It would probably be quite difficult to obtain co-operation in this work, for it is a field where there are supposed to be many secrets, but as there is practically nothing about it in the technical literature, there is a good chance to fill a distinct want.

REPORT OF THE SODA PULP COMMITTEE

By G. K. Spence, Chairman

During the past year the Soda Pulp Committee has devoted considerable time and study to a number of important problems relating to the industry.

The problems referred to are:

1. "Late developments in washing brown stock with continuous filters," which also includes the study of brown stock washing with centrifuges or in any other way.
2. "Evaporation of Spent Liquor."
3. "Deterioration of Color of Soda Pulp on Ageing."
4. "Reduction of Bleach Cost by Chemical Control."
5. "Chemistry of the Alkaline Wood Process."
6. "Various methods of reclaiming lime from the causticizing process in soda and sulphate pulp mills." These are all important problems in the manufacture of soda and sulphate pulp. At our sectional meeting Wednesday afternoon, all of these subjects will be discussed and if time will permit, other questions will be taken up; such as disposal of black ash, continuous causticizing, destructive distillation of spent liquor and extraction of pine chips before cooking.

Owing to the inability to secure a chairman for the Sulphate Committee the sectional meetings, as in the past two years, will be a joint meeting to discuss soda and sulphate pulp problems, and all subjects taken up will be common to both processes.

Due to the discussions and work of the Soda Pulp Committee during the past few years, a number of mills have made material improvement in their operating conditions, especially in the process of causticizing, cooking, washing and bleaching. During the next year your committee will have collected and studied enough data to give definite recommendations regarding washing brown stock, and methods for disposal of lime sludge from soda and sulphate pulp mills. Future work as planned will also cover disposal of black ash and improved methods of cooking and bleaching, as well as developments in destructive distillation of spent liquor.

REPORT OF THE COMMITTEE ON ABSTRACTS AND BIBLIOGRAPHY

By C. J. West, Chairman

The chairman of the committee regrets that he must again report that the work of the combined Committee on Abstracts and Bibliography has been confined almost entirely to routine matters during the year 1923. Much of the time of the chairman has been occupied in the completion of the translation of Heusers' text-book on Cellulose Chemistry (which has been prepared with the aid of Dr. G. J. Esselen, Jr., chairman of the Cellulose Section of the American Chemical Society), and also in the preparation of a bibliography of bibliographies on chemistry, and chemical technology, a compilation which will include about 7,500 references to bibliographies, and which, it is hoped, will be of some interest to the paper industry, inasmuch as it contains, among other things, references to practically all of the bibliographies on papermaking.

Abstracts

Through the able assistance of the abstractors for the Technical Section (John L. Parsons, A. Papineau-Couture, M. L. Caust and Paul Bartholow) it is felt that the literature of the papermaking industry has been thoroughly covered, and that abstracts of value have been supplied to the industry. The chairman has endeavored to classify these abstracts in such a way as to make them accessible, and believes that their value has been further increased by the preparation of a semi-annual index of the Technical Section. During the year 1923, the published abstracts totaled 76,178 words, which corresponds to approximately 900 inches, or about 45 printed pages. The chairman desires to emphasize that the credit for this work should be given entirely to the abstractors.

Bibliographies

During the year 1923 five bibliographies were published, as follows:

No. 37. American and Foreign Paper Trade Periodicals. Frederick C. Clark and Clarence J. West. Paper Trade Journal, 76, No. 4, 45-49 (Jan. 25, 1923). A revision of contribution No. 3.

No. 38. Paper research literature, VII. Revised. A list of contributions by members of the Bureau of Standards, Department of Commerce, 1910 to Dec. 31, 1922. F. A. Curtis and C. J. West. A revision of Contribution No. 18. Paper Trade Journal, 76, No. 6, 47-52 (Feb. 8, 1923).

No. 39. Electricity in Pulp and Paper Mills. A reading list. Clarence J. West. Paper Trade Journal, 76, No. 8, 5053 (Feb. 22, 1923).

No. 40. Bibliography of Papermaking for 1922. Clarence J. West and A. Papineau-Couture, Paper Trade Journal, 76, No. 16 to 26 (1923).

No. 41. Paper Research Literature. I. Contributions by Members of the Forest Products Laboratory. Paper Trade Journal, 77, 46-50 (Aug. 16, 1923).

In addition to these bibliographs, a bibliography on beating appeared in connection with that section of Volume IV of the text-books.

The chairman has continued in a small way his efforts to prepare a complete bibliography of papermaking. All of the references from Chemical Abstracts have been carded, as well as those from the Journal of the Society of Chemical Industry. It is hoped during the coming year that much of the work on this project can be completed. This will involve a page by page search of the papermaking magazines. It is felt that this search need not cover those periodicals issued before 1900, because most of the important work has appeared since that time.

Requests

The usual number of requests for bibliographies, photostatic copies of printed material, and loans of current magazines have been received by the chairman. In most cases, the information has been furnished, although in a few cases answers could not be supplied. It is to be hoped that this phase of the committee's work may increase in volume, because it is the best indication of the value of the committee's activities to the industry in general.

Definitions of Paper Terms

Your chairman has also served as chairman of the subcommittee on Definitions of the General Committee on Standardization of Paper Sizes of the Bureau of Standards, and with the able assistance of F. A. Curtis, prepared and published some definitions of some eight hundred paper terms. While it is realized that these definitions are preliminary in nature, they at least furnish a basis for discussion and constructive criticism.

REPORT OF SULPHITE PULP COMMITTEE

By R. A. Hayward, Chairman

The efforts of the committee have been divided into several lines, each member of the committee taking charge of one of the divisons.

Investigations have been made along the following lines:

1. Methods of testing the bleachability of pulp before charging the bleachers. This work has been carried on with an effort to determine the best method of testing the pulp so that it would be possible to add the proper amount of bleach for the charge.
2. The various means of effecting economies in the steam required for cooking.
3. An effort has been made to develop more accurate means of measuring the economy of acid plant operation. This work has been carried on with a view of making it possible to compare one plant with another in a more intelligent way.
4. Investigation has been carried on to determine the various ways and means of measuring wood into a sulphite mill.
5. R. N. Miller of the Forest Products Laboratory has been carrying forward his work on the Chemistry of the Sulphite Process.

Some of the members of the committee are ready to report on the work that they have been investigating, others have not completed their investigations and are not ready at this time to make a report or recommendations.

During the past year there have been some interesting developments in the sulphite process. Most of these developments have been based on an effort to increase the yield from the wood or with a view of affecting other economies in the process.

One of the plants in the middle West very recently started on a new process whereby they are cooking their pulp with a neutral sodium sulphite. This represents an interesting departure from the present method of cooking. It will be interesting to see how his process works out and it is hoped that a report can be made on it in another year.

A great deal of work has been done through the West on

a patented process involving the use of reducing reagents, particularly zinc dust, in the sulphite digesters. By maintaining a strongly reducing condition in the digester it has been possible to carry a higher combined acid. The result of this work has indicated that a higher yield is obtained from the wood and a better quality of pulp is also produced. The unbleached pulp is brighter in color and requires less bleach to bring it to the standard color of bleached sulphite.

Some work has also been carried with another patented process which reclaims the heat and gas from the relief of the digesters. This was accomplished by relieving from one digester into another during the early stages of the cook. This has already been reported on through the Technical Section.

An investigation has been made of the various methods that are now being used for testing the strength of the sulphite pulp. Very few of the mills are using the exact method adopted by the Technical Association a few years ago. Most of the mills have found that a beating curve is of more value than the single point as recommended in the Standard Method: This beating curve is made up by beating the pulp in the ball mill and testing it after every 1,000 revolutions. This curve is of value in determining the characteristics of the pulp. Several of the mills are using a small beater for making these strength tests. A small beater has the advantage that the tests can be made more rapidly and the action of the beater more nearly approaches the conditions that exist in the paper mills. The use of the beater has the disadvantage that it is hard for one mill to check the tests of another mill on the same pulp.

During the coming year it will be desirable to revise the standard methods of testing in the sulphite mill and bring these methods up to date according to the practices that are now in use.

PAPER DRYING COMMITTEE

F. R. Hyatt, Chairman

During the past year the activities of the Paper Drying Committee have been concentrated mainly on the formulation of a drying code which would cover all the essential items in connection with the steam consumption of paper machines.

The items of this code were decided upon finally at the Fall meeting of the Technical Association last October. It was then printed and sent out to a large number of mills about the middle of January of this year. We realize that due to the short time elapsed since receiving these, very few mills have had an opportunity to make tests and return the blanks. Therefore, I recommend that the committee, for the coming year, continue its activities along the lines it has just nicely started.

All machines should have a system that,

1—Keeps the driers free from water.

2—Keeps the driers free of air.

3—Prevents uncondensed steam from escaping from the driers.

At the same time the paper must be dried in such a way that the desired quality is not impaired.

We believe that the proper tabulation of the data for comparison from a large number of mills will help us all in accomplishing the essentials of any good drying system as listed above.

The next steps from an economical standpoint which are being developed in connection with the drying of paper are the recovery of heat from the water vapor leaving the machines and the drying of paper under a pressure less than atmospheric.

Both of these phases fall logically under the work of the Drying Committee and I recommend that they also receive our consideration during the coming year.

HEAT, LIGHT AND POWER COMMITTEE

The committee appointed consisted of the following members: W. W. Cronkhite, chairman; R. W. Leeper, Harry Lieback, W. F. Thiele, F. O. White.

During the year the committee has not been called upon to do any intensive investigation. Considerable information has been sent out to some of the members on specific problems such as illumination and power requirements.

The committee undertook to prepare for the annual meeting a report on Power Losses but its investigations have not advanced sufficiently to report at this time.

Another subject of interest was the use of accumulators, and steam turbines for paper and pulp mills, and this subject is under discussion by the committee now and no doubt something will be offered at the fall meeting.

The third subject is a moisture meter for automatically registering and indicating the amount of water in the sheet as it passes over the machine. We hope to have something to report along this line at the next meeting as the trial installation is now being put in.

The committee will undoubtedly confine its efforts for the coming twelve months to the study of the following subjects: Use of steam accumulators, heat losses, power losses, moisture meter.

In addition to the foregoing if any member has any suggestions to offer, the committee would welcome them.

REPORT OF THE COMMITTEE ON WASTE

R. B. Wolf, Chairman—G. D. Bearce, Vice-Chairman

The Committee on Waste has accumulated information, made investigations and rendered reports during the past two years upon the following subjects:

1. White water losses and their reduction.
2. The utilization of bark and wood refuse.
3. The reduction of broke losses.
4. Heat losses in pulp and paper mills.
5. Handling materials in pulp and paper mills.

White Water Losses

1. The report on White Water Losses covered the results of a number of tests supervised by representatives of the committee and contained figures supplied by companies interested in this particular problem. The report brought out the fact that the important things to be considered in an attempt to reduce the white water losses in pulp and paper mills are:

1. The reduction of stock loss through re-utilization of white water by means of self-cleaning shower pipes and other methods.
2. The reclamation of fiber and other material in white water by means of various types of savealls.

The sedimentation tank appears to be admirably suited to mills using stock that contains considerable filler. Mills which use a small amount of filler apparently get the best results by a combination of screen saveall and sedimentation tank. The mills that use a long fiber stock exclusively, obtain satisfactory results with one of the various types of screen savealls.

It was pointed out that it is feasible under operating conditions to reduce the fiber and filler loss to less than 5 lb. of material per 10,000 gallons of waste white water. The maximum allowance for losses based upon pulp or paper production, as indicated in previous reports, is estimated as follows:

1. All long fiber stock 0.5 per cent.
2. Mixed long and short fiber 1 per cent.
3. Short fiber stock 1.5 per cent.

Steam Pollution

In connection with white water losses the problem of stream pollution cannot be over-emphasized. Many states have laws or pending legislation regarding stream pollution. Among these are the states of Massachusetts, Michigan, Wisconsin and Pennsylvania. If the individual pulp and paper mills study and solve their problems they will not only reclaim fiber that is of appreciable value, but will also meet the requirements of any laws or inevitable legislation regarding stream pollution.

The future work on white water and fiber losses must necessarily be done by the individual companies. The information regarding the tests is available and the data will show them just what can be accomplished at their own mills under their particular operating conditions. The Forest Products Laboratory in co-operation with the Committee is developing a method of comparing the white water losses at different mills. They will ask a number of mills that make the same product to report their stock loss figures to the Laboratory on a standard form. This information will be tabulated and returned to the participating companies so that they will be able to compare results with one another.

Bark and Refuse Utilization

2. The complete report on Bark and Refuse Utilization will be presented in the near future and contains all available data upon bark presses and the furnaces now used in the utilization of wood and barking refuse. The report will cover the various methods of handling this problem under different conditions, and will give figures that will indicate the improved results that can be obtained with adequate equipment and proper control.

Appreciable savings can be effected by the more economical utilization of bark and while tests indicate that each mill has its own particular problem, the construction of the furnace, control of the air, and the method of feeding the fuel are three points that must be given special attention. In general, all refuse must be approximately 50 per cent dry in order to be burned with reasonably good efficiency.

Reduction of Broke Losses

3. The Reduction of Broke Losses was reviewed and this subject is a continuous individual problem with each mill. Considerable interest was stimulated and the forms of operating reports that were suggested by the Committee have been adopted by a number of plants with effective results. Constant records showing the per cent of broke loss are of much value.

Heat Losses

4. The report of Heat Losses in Pulp and Paper Mills outlined the various sources of loss in the entire mill. Each mill has its particular problem and a more detailed study by departments can doubtless be made by the Heat, Light and Power Committee which will result in further valuable information. The heat losses in the sulphite, soda, and sulphate mills should also be considered by the committees that deal with the manufacture of these pulps.

Handling Materials in Pulp and Paper Mills

5. The report on Handling Materials in Pulp and Paper Mills gave an outline of material handling problems and also a classification of handling equipment. The application of handling equipment was briefly taken up for each commodity and the various handling methods were illustrated.

The handling of materials is a very important item of cost in the manufacture of paper which has greatly increased during the past few years on account of the rapidly increasing cost of labor. Each mill has its particular problem and a study of the cost of handling a commodity under present methods compared with the installation and handling cost with modern equipment should be thoroughly investigated.

The Utilization of Decayed Wood for Pulp

This is one of the most important problems that confronts pulp and paper mills at the present time. Realizing that it is an international problem a Joint Committee was appointed to co-operate on this work, representing the Technical Association, Woodlands section of the Canadian Pulp and Paper Association, the Forest Products Laboratory, and the News Print Service Bureau. During the present year the co-operation of the Woodland section of the American Paper and Pulp Association. Much valuable information has already been obtained and further reports will be submitted to the Technical Association as the work progresses.

Recommendations

The Committee believes that its main function in the future should be to assist the regular standing committees to take up problems dealing with the elimination of waste in their respective fields. The committee should act as a co-ordinating medium with such organizations as the Forest Products Laboratory and the Bureau of Standards in order to make available the results of their findings. The Committee should also assist these agencies to continue their co-operative studies on waste elimination problems at the various mills interested in this work.

The association also held a very interesting meeting Thursday afternoon at the Grand Central Palace in conjunction with the Paper Industries Exposition, at which quite a program of papers on technical subjects was arranged. The papers and their authors were as follows:

"The Dorr Save-all," H. A. Linch, The Door Company.

"Special Soft Rubber Press Rolls," R. H. Whitney, The B. F. Goodrich Rubber Company.

"White Water Economy," L. M. Booth, Booth Chemical Company.

"Ball and Roller Bearings in the Paper Industry," G. H. Spencer, SKF Industries, Inc.

"The Vickery Felt Conditioner," Phillips Dennett, Bird Machine Company.

"Papermaking Opportunities in the South," Charles A. McKeand, Seaboard Air Line Railway.

"Electricity in the Paper Industry," W. W. Spratt, Westinghouse Electric & Manufacturing Company.

"Tachometers," Karl O. Kunde, The Electric Tachometer Company.

"A Paper by C. S. Hardy & Sons Co., Air Cleaning Equipment," A. M. Goodloe, Midwest Air Filters.

"Drainage of Paper Machine Driers," A. E. Armstrong, Armstrong Machine Works.

"Electric Flowmeters," R. E. Wooley, General Electric Company.

"Short Center Belt Drives," Viggo Samuel, F. L. Schmidt & Co.

"The Use of Roller Bearings on Paper Making Machinery," D. E. Batesole, The Norma Company of America.

"The Importance of Good Rolls," James A. Cameron, Cameron Machine Company.

T. A. P. P. I. Banquet

The ninth annual banquet of the Technical Association of the Pulp and Paper Industry was given in the East ballroom of the Commodore Hotel on the evening of April 8. More than 200 members and guests were present, and during the serving of dinner an orchestra enlivened the atmosphere by the ren-

Picture taken at Annual T. A. P. P. I. Dinner, April 8, 1924, Commodore Hotel, New York City

dering of popular and oldtime selections, with the diners joining in singing some of the songs.

President Taylor presided as toastmaster, and following a few remarks by him welcoming the members and touching on the aims of the association, George Williamson, a former president of the organization, read a poem written for the affair by Judge Charles F. Moore, who for the first time in a good many years was absent from the Technical Association dinner.

The first speaker of the evening was James P. Jordan, president of the National Association of Cost Accountants, who spoke on the subject of "Costs." Mr. Jordan dwelt for some time on an elaboration of the executive of olden days, and then described the executive of the present, and predicted that the executive of the future will be a technical man in every sense of the word.

A humorist, billed as "John Smith of the High Speed Paper Company, New Mexico, Ala.," told a series of humorous yarns and kept his hearers in an uproar of laughter for a few minutes.

Paul T. Brady, of the Westinghouse Company, delivered a very interesting speech on the subject of "Power." Mr. Brady treated with the evolution of power, going back to the early days when slaves generated the first power by utilizing their muscles in pulling or pushing; then describing the graduation to animal power, when oxen or other animals were used in place of slaves, and then the beginning of steam power, and thence the development of electric power. He stated that practically all the development in power has been made in the last hundred years, and that the initial development in electric power was in 1876, thereby making electricity a comparatively recent development.

Miss Helen U. Kiely rendered several entertaining vocal selections, following which a very amusing skit entitled the "Chronicles of Tsai Lun" was put on by Royal S. Kellogg, who, dressed in Chinese garb and accompanied by some weird Chinese music, held the attention of those present by depicting the "spirit of papermaking."

Edward Beck, secretary of the Canadian Pulp and Paper Association, was called on by President Taylor, and in a few remarks told of the work being performed by his association. Mr. Beck said that the papermaking text books published a year or so ago were now being translated into French so that the workers of that nationality in Canada could use them for study.

President Taylor also called on John Raquarr of the Mead Pulp and Paper Company, Chillicothe, Ohio, who recently returned from a trip abroad, and Mr. Raquarr described some of the interesting things regarding equipment, etc., which he saw in the paper mills of Scotland, England and France.

Salesmen's Association Meeting

DISCUSSION of the importation of large quantities of low-grade paper, frequently under false classification and at undervaluation, and means to combat this unfair and injurious competition was the principal feature of the fifth annual meeting of the Salesmen's Association of the Paper Industry at the Waldorf-Astoria Hotel, New York, on April 8. The meeting was held in the East room of the Waldorf and was largely attended. J. L. Fearing, president of the association, was in the chair and called the meeting to order.

Mr. Fearing introduced Francis H. Sisson, vice-president of the Guaranty Trust Company of New York, who spoke on the subject of "Business Conditions, Today and Tomorrow." Mr. Sisson said in part.

"Basically, business conditions throughout the country are progressing satisfactorily, but there is a tendency on the part of business interests to await tax reductions before undertaking further forward movement. The plethora of money in the banks is due in part to high taxes and the resulting disinclination of investors to let their funds move into regular investment channels. In fact, had the tax bill been passed as introduced by the Administration shortly after Congress convened, the country would probably have experienced a material increase in business and a general stimulation of industrial activity.

"Pessimism in regard to the future finds little justification at the present time. Only a catastrophe can check its upward and onward course, and the possibility of such a catastrophe now seems remote. Experience has always shown that in the last analysis the conservative forces of the United States remain dominant. This is the year of a presidential election and coming months will no doubt be characterized by a certain hesitation in business. These influences, however, are essentially temporary in their effect and should not seriously retard the generally favorable progress of business. In fact, it is believed that the outlook for the future justifies a remarkable degree of optimism on the part of trade and industry. The domestic market is very large, production and consumption are on a satisfactory scale, and the foreign situation is definitely improving. In fact, no country in the world is so soundly buttressed financially and economically as the United States today."

Warren B. Bullock, secretary and treasurer, then presented his annual report as follows:

Inasmuch as the present secretary has been in office only three months, the report will be exceedingly brief and only a general review of the year's work.

Owing to a special emergency requiring his full attention to emergency activities relative to the proposed Canadian pulpwood embargo, Mr. O. M. Porter was obliged to relinquish his duties as secretary and was succeeded by Thos. J. Burke. The latter in turn facing an opportunity to do great services to the paper industry by a special campaign on the refund of income taxes improperly levied, resigned and in this emergency the American Paper and Pulp Association loaned the present secretary without charge to the Salesmen's Association that the work of the Salesmen's Association might be carried on without a hitch.

The Association began the year with a cash balance of $1,018.56 with outstanding bills in excess of this amount. The dinner tonight bids fair to produce sufficient funds to partly meet the deficit, due to the Fall Conference in Chicago.

The membership of 196 men as of March 31, 1924, should produce an income of nearly $4,000. Of this membership 10 are delinquent, but five new members are included in this list, having been accepted by the Membership Committee so near to the end of the year that their membership begins as of April 1, 1924. This, therefore, makes a membership of 191, even eliminating the delinquents.

The secretary will make only routine recommendations:

1. Continuance of the publication the weekly information bulletin and the monthly Lefax Bulletin.
2. The Association membership must be kept regularly informed of anything of interest to a paper salesman.
3. Continue activity of the various divisions and the extension wherever possible of the New York and Chicago programs of regular meetings.

Discuss Import Problem

The meeting thereupon resolved into a discussion of the import problem, and the following resolution was adopted unanimously after being introduced and read to the assemblage by George K. Gibson, of the Wausau Sulphate Fibre Company, Chicago:

"Whereas, the paper industry of the United States is suffering from the continued and increasing volume of cheap made foreign paper imported and put upon the market of the United States at prices less than the said imported papers can be produced in the mills of the United States, and

"Whereas, the paper mills of the United States are wholly unable to meet this pirate competitor due to the fact that they must pay their American workmen the highest prices for labor on earth, and also the consequent high raw material transportation and tax charge, and

"Whereas, charges are freely made and widely circulated to the effect that quantities of this cheap-made foreign paper are coming into this country falsely classified and evading the customs law of the land, and

"Whereas, these import abuses and crimes demand that the entire membership of the paper industry in the United States do immediately create and erect some adequate and powerful agency which shall put an end to this strangling menace to our industrial prosperity, and

"Whereas, the paper industry in the United States is today without any such powerful and adequate agency for the purposes required, and

"Whereas, it appears that the one sole reason why no such immediate competent and adequate measures are available to cope with this import menace is because of the lack of some comprehensive plan backed by sufficient funds to make it effective, and

"Whereas, we believe that our American paper markets exist primarily for the benefit of the American manufacturers, workmen and consumers, and further, that American people will buy American paper to the exclusion of cheap-made foreign-made paper products if they be shown the perils that confront their American industry, and

"Whereas, we believe that the perfection and adoption of some adequate plan backed by sufficient funds, directed by the American paper industry as a whole, is the proper man-

ner in which to proceed to educate the buyers of the United States in favor of the American paper products and to correct and put a stop to the unlimited entry of the cheap-made foreign papers into this country.

"Therefore, be it resolved by the members of the Salesmen's Association of the Paper Industry in annual meeting assembled on this eighth day of April, 1924, that we do hereby call upon the executives of the American Paper and Pulp Association to take some immediate action toward the adoption of some adequate plan backed by the requisite funds necessary for the protection of the American paper market from the invasion of the cheap-made foreign paper products; and be it further

"Resolved, that the Salesmen's Association of the Paper Industry pledges 100 per cent co-operation to the American Paper and Pulp Association in any and all efforts it may undertake for the adequate grappling with this huge problem.

"Resolved, that a copy of these resolutions be transmitted by this association to the president and secretary of the American Paper and Pulp Association with the request that the subject matter of these resolutions be made a matter of consideration at their annual meeting on Thursday next, April 10."

Officers Elected

J. L. Fearing, of the International Paper Company, New York, was re-elected president of the association for the ensuing year. Walter E. Perry, of the Chemical Paper Mfg. Company, Holyoke, Mass., was elected vice-president for the New England district; F. N. Countiss, of the Martine Cantine Company, New York, was chosen vice-president for the New York district; J. Ray Russell, of the Marathon Paper Mills Company, Chicago, vice-president for the Chicago district, and R. T. Houk, Jr., of the G. H. Mead Company, Dayton, O., vice-president for the Miami Valley district. Warren B. Bullock was again elected secretary and treasurer.

Salesmen's Annual Dinner

The fifth annual dinner and smoker of the Salesmen's Association was given on the Roof Garden of the Waldorf-Astoria Hotel Tuesday evening, April 8. The affair was informal, and upwards of 200 members and guests were present, the crowd comfortably filling the dining room. The assembled salesmen were chock-full of good fellowship and there was a good deal of hilarity during the serving of dinner, which was helped along by a very ambitious and hard-working song leader, who kept the diners well occupied and keyed up singing the old-time and popular melodies to the accompaniment of an orchestra.

The diners quieted down, however, when the dinner was over and President Fearing, who acted as toastmaster, began speaking, since there was a good deal of curiosity regarding the so-called "Wise Plan" evolved by Henry A. Wise, formerly Attorney General of the United States, to stop the promiscuous importing of foreign-made paper into the United States, which plan had been widely advertised in the trade press prior to the convention of papermakers.

Before introducing Mr. Wise, President Fearing reviewed in brief the history of the Salesmen's Association since its organization five years ago, spoke of its growth, and closed his remarks by reciting Dr. Frank Crane's ten commandments of good salesmanship.

Wise Plan Outlined

The Wise Plan, as outlined by Mr. Wise, provides for the formation of an active and intelligent organization to investigate at the source of supply in Europe and also in the United States on the arrival and delivery of goods, the quality, price, classification, description or other particulars of foreign-made paper shipped to America, with the purpose in view of preventing the unfair and illegitimate tactics of which some European shippers and American importers are accused.

Mr. Wise devoted the first part of his speech to an outline of the situation existing as a result of the large shipments of paper of certain kinds from Europe to the United States. He stated that it is well known that unfair competition is being waged by importers and that the influx of foreign merchandise was hurting the domestic paper industry to no small extent, declaring that the paper industry in this country is equipped for greater production than the domestic market required and that not a single paper mill in the United States has run at full capacity in the last twelve months.

He enumerated the various corrective measures that might be resorted to for restricting imports of foreign paper and said that the government provided ample machinery for dealing with the unfair competition, but that this machinery was not self-operative, but available to those making complaints and that therefore it behooved the paper industry to secure the proof of improper importation of paper and present the facts and figures in specific cases to the government for action.

Mr. Wise's plan would have a well-organized group of investigators stationed at the sources of paper production abroad, at the ports of shipment in foreign countries, and at the ports of arrival in the United States, who would examine paper shipments as to quality, description, markings, etc., and report to a central bureau located probably in New York. Any attempts to ship paper into the United States of other than specified quality, grade, quantity, etc., could therefore be stopped before the merchandise leaves its source, and the matter, with the facts necessary for government officials to take action, could be placed in the hands of the authorities.

Mr. Wise stated that, to be successful, the plan must be adopted by the entire American paper industry, and pointed out that if the whole industry did adopt the scheme the cost of maintaining such an organization would be exceedingly small to the individual mill or company. He emphasized that paper manufacturers insure their plants, insure their inventories, insure their employes, and yet were permitting a condition to go on which may eventually destroy everything they have built up. He closed his speech by calling on the entire paper industry to adopt the plan and set up a real protective agency to prevent the unfair competition of foreign manufacturers in the American paper market.

Following Mr. Wise, H. V. Kaltenborn, associate editor of the Brooklyn Daily Eagle, spoke at length on "Current Events." Mr. Kaltenborn reviewed the political, financial and economic conditions in all the important countries of the world, dwelling particularly on the situation in Germany, Italy and England.

After Mr. Kaltenborn finished speaking, President Fearing called for a rising vote on the "Wise Plan," asking every one in favor of the plan to stand, and virtually every one in the room arose.

A vaudeville program by well-known stage artists, including entertaining singers and dancers and a magician, followed on a stage erected at one end of the Roof Garden. The festivities continued until past midnight.

Woodlands Section Meeting

C. W. HURTUBIS, of the Hammermill Paper Company, Erie, Pa., was re-elected chairman of the Woodlands Section of the American Paper and Pulp Association at the annual meeting of that section on April 9 in the Waldorf-Astoria Hotel, New York. George N. Ostrander of Finch, Pruyn & Company, Inc., Glens Falls, N. Y., was re-elected vice-chairman, and O. M. Porter of New York was again elected secretary and treasurer.

Chairman Hurtubis and Vice-Chairman Ostrander, together with D. E. Lauderburn of the Pejepscot Paper Company, Brunswick, Me., and Edward S. Bryant of Boston, Mass., and Secretary-Treasurer Porter as ex-officio members, were elected to compose the Executive Committee, with E. S. Holloway of the Hammermill Paper Company, Mantane, P. Q., and Ellwood Wilson of the Laurentide Company, Ltd., of Grand Mere, P. Q., chosen as members at large.

Following Chairman Hurtubis's welcome to members and guests, the secretary and treasurer rendered his annual report.

S. T. Dana, director of the Northeastern Forest Experiment Station, spoke as follows:

"The first study undertaken by the Northeastern Forest Experiment Station of the United States Forest Service was in behalf of the paper industry, which is recognized as the leading American industry in the reforestation movement. This study was the growth and yield of spruce and balsam fir. Dependable figures are almost wholly lacking as to the yields to be exepected from these species at different ages and under different conditions. Yet, no company is in a position to make intelligent plans for the future unless it knows what growth is taking place on its holdings and what future yields may be expected at any given period after different methods of cutting. Only with the help of definite figures on these points can it answer such questions as to whether or not it is overcutting its lands, what acreage it must have to meet its needs, and when and at what cost merchantable material can be secured from plantations. Closely allied with this investigation are studies of volume tables for pulpwood species and of the kind and amount of reproduction that may be expected as a result of different methods of cutting under the widely varying conditions of stand, soil, topography, and other factors found in the spruce forests of the Northeast.

"The field covered by the Forest Experiment Station includes the six New England States and New York, a region with a

wide variety of forest types and with a total forest area of approximately forty million acres.

"The station looks forward to conducting a considerable part of its work in the closest possible co-ordination with the pulp and paper industry. Representatives of the industry are included in the Council, one of the members of which is chairman of the sub-committee for the Northeastern Station appointed by the Advisory Committee of the Pulp and Paper Industry to the Department of Agriculture. Sub-stations will also in all probability be located in parts of the region in which the industry is particularly interested."

G. W. Boyce of the United States Forest Service spoke and stated that the United States consumed more paper in 1923 than in any previous year of its history.

"In studying the relationship of paper to the forestry problem," he said, "the Forest Service finds that in 1923 the United States consumed 8,500,000 tons of paper, of which 7,200,000 was made in this country. Of the imported paper, by far the largest quantity was newsprint imported from Canada, and the highest previous record for paper consumption was the consumption in 1922 of 8,003,000 tons."

H. B. Shepard, consulting forester, spoke on "Pulpwood Supplies," and whether a paper company can afford to spend money on its timberlands to insure increased production.

The Woodlands Section held a joint session on the afternoon of April 9 with the Technical Association, at which E. S. Bryant, consulting forester, spoke on "Elimination of Waste and the Reduction of Logging Operation Costs"; John D. Rue of the U. S. Forest Products Laboratory and John E. Alexander of the Nekoosa-Edwards Paper Company, Port Edwards, Wis., discussed "Pulpwood Decay," and Prof. S. N. Spring, of Cornell University, spoke on "Commercial Reforestation" and displayed a film entitled "Bare Acres," prepared by the New York State Conservation Commission.

Division Meetings

United States Pulp Producers' Association

A turn for the better in the American pulp industry was reported at the annual meeting of the United States Pulp Producers' Association on April 8 at the Waldorf-Astoria Hotel, New York, when it was found by reports from all parts of the country that the importers have injured their own market by the recent sacrifice sales of Scandinavian pulp. Foreign pulp has been sold at prices which forced the shutting down of some domestic mills, where the paper manufacturers found they could buy pulp cheaper than they could make it in their own pulp mills. The foreign manufacturers have lost so heavily by their competition for American business that they are being forced to change their marketing policy, and the results are already beginning to be felt.

Officers of the association were elected as follows: President, D. C. Everest of the Marathon Paper Mills Company, Rothschild, Wis.; vice-presidents, L. M. Alexander of the Nekoosa-Edwards Paper Company, Port Edwards, Wis.; E. W. Kiefer of the Port Huron Sulphite and Paper Company, Port Huron, Mich., and W. H. Savery of the Harpers Ferry Paper Company, Harpers Ferry, W. Va., and secretary and treasurer, O. M. Porter, of New York City.

The following were elected members of the Executive Committee: Herman Elsas of the Continental Paper and Bag Mills, New York City; George W. Sisson, Jr., of the Racquette River Paper Company, Potsdam, N. Y., and Norman W. Wilson of the Hammermill Paper Company, Erie, Pa.

A Membership Committee composed of G. E. Crafts of the Orono Pulp and Paper Company, Bangor, Me., and Henry W. Stokes of the York Haven Paper Company, Philadelphia, also was elected.

Association of Paper Specialty Manufacturers

A new association, the Association of Paper Specialty Manufacturers, was formed at a meeting on April 8 at the Waldorf-Astoria Hotel, the membership including manufacturers of paper cups, towels, flypaper and various unique specialties. The officers elected were: President, W. R. Linderking, of the Purity Paper Vessels Company, Baltimore, Md.; vice-presidents, Emil Hansen of the Fort Howard Paper Company, Green Bay, Wis., and Carl Becker of the Westfield Paper Company, Westfield, Mass., and secretary-treasurer, J. E. Willert, New York City.

Converting Paper Mills Association

Discussion of the foreign import situation as it relates to the book paper mills, particularly those in the middle West, was an outstanding feature of the discussion at the meeting of the Converting Paper Mills Association on April 8. This association, which for the past year has been conducting its work independently of the American Paper and Pulp Association, decided to have its statistical work handled in the future by the central association.

Cardboard and Glazed and Fancy Paper Manufacturers' Associations

The Cardboard and Glazed and Fancy Paper Manufacturers' Associations, whose secretarial and general association work has been handled by the American Paper and Pulp Association since the retirement of Jacob Erichsen to enter the pulp trade, decided at their meetings on April 9 to continue their present organizations and work through the American Paper and Pulp Association. The Gummed Paper Manufacturers' Association, the third organization handled by Mr. Erichsen, did not decide on its future policy but is considering a slightly different form of association activity.

Waxed Paper Manufacturers' Association

Waxed paper manufacturers, after two days of conferences, formally organized an association which will have nearly 80 per cent of the tonnage of that group of the industry represented in its membership. The new association decided to affiliate with the American Paper and Pulp Association. The old association of waxed paper manufacturers was dissolved about a year ago.

Tissue Paper Manufacturers' Association

F. W. Hoefler of the Oswego River Paper Mills, Phoenix, N. Y., was elected president of the Tissue Paper Manufacturers' Association at the annual meeting of that body on April 8 at the Waldorf-Astoria Hotel. Mr. Hoefler succeeds John Brannan of the North End Paper Company, Fulton, N. Y. J. B. Rieg of the Erving Paper Mills, East Walpole, Mass., and H. W. Brightman of the Northern Paper Mills, Green Bay, Wis., were elected vice-presidents, and Emmett Hay Naylor was again chosen secretary and treasurer.

Simplification Committee

Unanimous approval of the proposals of the Department of Commerce for simplification of paper sizes was the result of a conference held by call of W. A. Durgin, chief of the Division of Simplified Practice, at the Waldorf-Astoria Hotel on April 8. In the early part of the discussions, participated in by key men in the manufacture, distribution and consumption of paper, the publishers, lithographers, printers and purchasing agents told of having made efforts to secure pledges from their members to follow the standard sizes recommended for paper for their use. The proposal's aim at the economy of manufacture, and the lowering of the cost to the consumer by reducing the large number of sizes of paper used by the consumers.

After the consumers had stated their position, representatives of the manufacturers and distributors were asked to state their position, and said that such a reduction and elimination of unnecessary sizes would mean much to them, but that in the last analysis the manufacturer would usually make the size demanded by his customer. When a vote was taken, the sentiment was unanimous in favor of the adoption of the new program for a limitation of sizes.

Waste Merchants of N. Y. Dinner

More than 200 members and guests, including a generous number of paper mill men who were in New York for the annual paper manufacturers' convention, attended the sixteenth annual dinner and entertainment of the Waste Merchants' Association of New York, whose membership embraces practically all of the important concerns in Greater New York dealing in paper mill supplies, at the Commodore Hotel, New York, on the evening of April 9. During the serving of dinner a jazz orchestra played many popular selections, and the diners joined in singing the well-known songs.

After dinner a splendid vaudeville program was put on, the singers, dancers and chorus of pretty girls performing on an elevated stage built in the center of the dining room. The full retinue of cabaret performers from the Rockwell Terrace Restaurant in Brooklyn provided the entertainment, which lasted for about two hours.

National Paper Trade Association

William F. McQuillen of A. Storrs & Bement Company, Boston, Mass., was elected president of the National Paper Trade Association of the United States, whose membership embraces practically all of the large jobbers of paper of the country, at the annual convention of that organization in the

Waldorf-Astoria Hotel, New York, on April 9. Mr. McQuillen succeeds Frank W. Power of Carter, Rice & Company, Boston.

Albert M. Miller of Columbus, Ohio, was elected vice-president in charge of the Fine Paper Division, and James A. Carpenter of Kansas City was chosen vice-president in charge of the Wrapping Paper Division. William C. Ridgway was again elected secretary, and Charters K. Higgins of Chicago assistant secretary.

Special Soft Rubber Rolls for Paper Machines*

By R. H. WHITNEY

THE results arrived at in this discussion are based almost entirely on the stated purpose of the Technical Association of the Pulp and Paper Industry: "An interchange of ideas among its members in order that processes of manufacture may be made more efficient and improved along technical lines." We are indebted to S. D. Warren Company, Hammermill Paper Company, Michigan Paper Company, Fletcher Paper Company and others for comparisons made between the new soft rubber rolls and those previously used. Especially do we appreciate the cooperation of H. F. Obermanns of Hammermill Paper Company who has given much time and assistance in obtaining accurate data.

Corrugation

Papermakers generally have wanted to use softer rolls but have not been able to do so because the old line soft rubber covers corrugated quickly. This resulted in constant regrinding and production loss. In our table we have had to omit figures on the length of time these new rolls have run without corrugating because none of these have as yet corrugated. There are 50 in operation and so far only 2 have had to be reground. (Reports on these were not available for this paper.) With 48 out of the 50 running from 1 to 9 months and showing no sign of wear we believe that this question is answered to everyone's satisfaction.

Water Removal

How much water will they remove? Naturally a harder roll should take out more water than a soft one. The pressure is applied along a small contact area and is greater per unit area with the hard roll. Yet looking at the tabulation of actual service results you will see that these new soft rubber covers testing 92 to 102* are removing as much as former rolls testing 45 to 60 with the same pressures, speeds and felts. In one case there is a slight increase indicated with the soft roll, in another a practically negligible loss of ¾ of 1 per cent is reported. All others are taking out the same amount as formerly. I could amplify this by ten verbal reports (some based on laboratory moisture tests) that show the same satisfactory result.

The evident conclusions was most surprising to me; it may be to many of you. The only way we can account for it, is that the extreme resiliency and comeback of the new compounds aids in the squeezing action and compensates for hardness in the former covers which lacked this resiliency.

It is generally recognized that the use of a more open felt allows greater water removal. The softer rolls have repeatedly proved that they go far in eliminating felt marks, thus making more open felts practical. In one mill they are now successfully using a more open felt with the soft rolls, and while it is not yet possible to publish the results we know these are satisfactory.

More pressure can be used with the soft rolls without harm to the sheet or felt. Naturally this is harder on the roll, but in one case an additional 3600 lbs., have been added and the soft roll has been running for 5 months without showing any ill effects. The increased pressure took out more water.

Summing up the investigation as to comparative water removal: We have found that the new soft stocks are satisfactory in all cases; also they pave the way for taking out more water in the press, which will reduce drying costs and make higher speeds practical on present machines.

Felt Efficiency

The reports tabulated give such a clear picture of the increased felt efficiency with the softer rolls that little discussion is necessary.

Wherever any attempt has been made, or other factors permit, felt washing has been reduced from 33 to 70 per cent. This is truly a big advantage in many ways, and measured in dollars and cents this item alone will in most cases more than pay the roll cost.

We find that felts last from 25 to 50 per cent longer with the new soft rolls than they did before. A score of additional verbal reports say the same thing and in only one instance can we find that felts have only given equal to previous service.

These results are fine, but they are going to be a lot better. Again we must recognize that the soft rolls allow for more open and harder twisted felts. These will be tougher and last still longer, and they will not fill up so quickly. So once again, what has been accomplished points ahead to still greater efficiency.

General Application

We have been talking entirely on first press rolls. It may be interesting to note other applications of these new soft stocks in some of which they have already proved advantageous.

They are running on second and third presses showing no weakness and helping the felt and sheet. On a smoothing press their ability to maintain a natural surface longer than old line compounds makes them exceptionally good. You will be interested in the surface of the roll on exhibition in Booth 44A of the Exposition. This shows more clearly than I can tell, the extremely smooth finish which the new covers acquire after 1 or 2 weeks in operation and maintain throughout the life of the roll. One mill says they are the finest thing ever seen on a smoothing roll.

Running in hot glue at a temperature of 170 deg. fahr. they have already exceeded previous service from other covers and are still going strong. We have them on waxing and sizing rolls and while it is not yet time to make established claims it is only logical to expect that wherever heat is encountered the new stocks will be a great improvement as you will see shortly.

For squeeze rolls and primary presses they have given absolute satisfaction and are now being tried out on the regular press of machines making heavy board. Two rolls have also been covered for top suction rolls although we make no claims for this work as yet.

Altogether, being less affected by age, maintaining a natural surface longer, resisting heat better, and giving greater cushioning, these new compounds apparently offer opportunity for economy on paper machine rolls in general.

The New Rubber Compounds

Questions come up as to how these new stocks differ from the previous rubber roll coverings used. To answer this requires some consideration of rubber manufacturing problems and means of determining physical properties of different compounds.

The problem of covering a paper machine roll becomes involved by the necessity of tying the cover to the metal core with a hard rubber or vulcanite base. The coefficient of contraction of hard rubber is several times greater than metal, and as it remains rigid after curing there is a powerful grip between the two. In turn, the base and cover being cured at the same time unites these and anchors the cover.

The roll is given one cure which must be long enough to cure the hard rubber. It is obvious that the soft rubber cover and the base must be perfectly balanced or the cover will have been overcured when the hard rubber is cured to its proper and necessary hardness. Practically all cover stocks were formerly overcured when the base was properly cured.

The results of overcuring are not seen immediately after cure, but in the course of several months these compounds lose their resiliency and comeback. In addition an oxidized skin or crust forms on the surface, which offers little resistance to abrasion. On press rolls a soft cover is flattened out at the point of contact. The cover must have resiliency to regain its original shape during each revolution. As the old stocks lost their life this distortion showed itself by a washboard appearance on the surface of the roll, which simply means the rubber had lost its ability to resume its natural shape after being flattened out. Soft stocks compounded along new lines and adjusted to a hard rubber core, when aged in the life oven and put through a hysteresis test, at once indicated unusual ability to withstand internal strains over a long period, and to maintain a natural surface.

The life oven is used to artificially age rubber. By applying a predetermined temperature we may, for instance, represent a year's normal aging by two days in the oven. The hysteresis loop is the curve developed by a tension arm during constant stretching and contraction of the rubber. This measures the fatigue of the rubber from internal rearrangement (as evidenced by heat) and compares roughly to the action a roll must withstand in service.

A comparison of the new compounds with the best old line

(*Presented at the Annual Convention of the Technical Association of the Paper Industry, April 9, 1924, at New York City.)

*All figures given on hardness refer to penetration of a ½ in. ball point and 1 kg. weight on a Pusey & Jones plastometer.

stock obtainable is shown in figures taken from several of these curves. The old line stock has a hardness of 50. Against this we show the new compound "Kraft" of the same hardness, and the new "high speed news," testing 95. It is of course difficult to get an accurate relation between compounds of different hardness, but remembering that in each case the cure has been balanced to a hard rubber cure, the results are of value, and have so proved in actual service. The efficiency of the first loop is of no value for our purpose, as the internal rearrangement to working conditions has not taken place. We have therefore taken results at the fifth loop or distortion of the rubber.

With results taken directly after curing, after a medium aging and after comparatively long aging, we get these figures:

Stock	Efficiency No Aging Percent	Medium Aging Percent	Long Aging Percent
HSN	86.1	83.7	80.7
Kraft	82.7	68.6	42.4
Old compound	63.9	Broke down	Broke down

The comparison with HSN must include the fact that being much softer it is distorted more in service, but the other two are on exactly the same basis and these figures leave no room to question the superiority of the new compounds.

This last chapter may have seemed so distinctly a treatment of rubber as to be irrelevant here. However, we have already shown that these newly developed soft rubber compounds as roll covers,

1. Do not corrugate quickly, causing expense or production loss due to regrinding.
2. Remove the required amount of water.
3. Pave the way for taking out more water.
4. Cut down felt washing.
5. Increase felt life.
6. Decrease felt marking.
7. Allow the use of more open and tougher felts.
8. Make higher speeds and more continuous production possible.

In doing these things we believe they fairly earn at least this superficial explanation as to how they stand out as a real advance in the chemistry of rubber brought to the service of the paper industry.

The sample displayed at the Paper Industries Exposition was removed from one of the machines in the Hammermill plant at Erie which was installed there nine months ago and being the first soft rubber roll to be used by them. During this period of time it has produced 13,000,000 lbs. of paper with no results of corrugation and those who examined the roll on display witnessed its perfect condition. It is natural that this roll will be reinstalled without regrinding. The roll measures 100" and has been traveling 425 F.P.M., operating at a pressure of 10,000. It is 20" in diameter with a 1" thick roll covering and the crown is .043. The crown and surface has been unchanged. This nine months' test seems to have proven the continued resiliency of their new rubber covering.

Hardness when installed 92—95—92.
Hardness after 9 months' service 92—94—92.

Forestry in Massachusetts

How Massachusetts could use its forest lands to meet the high and increasing cost of government was pointed out before the Kiwanis Club of Springfield, Mass., by Dr. Hugh P. Baker, executive secretary of the American Paper and Pulp Association.

"Massachusetts state taxes have increased," he said, "from $7,988,000 in 1912 to $18,513,000 in 1922. The cost of government increased from $17,052,000 in 1913 to $42,967,000 in 1922; the total per capita tax, federal, state and local, is now $124.41. On the other hand, the state has 3,000,000 acres of forest land, only a little of which is actually producing trees. And yet this area, if devoted to the production of timber—the same timber which once provided the raw material needed by the state for building and industrial use, could once again supply the state in large part with the timber it needs, and save the great cost of transportation of the lumber now brought in from the South and the Pacific states.

"Out of a total land area in the state of 5,321,000 acres, only 908,000 are under the plough, and the state owns only 65,000 of the 3,000,000 acres of forest land. By developing its forests Massachusetts could bring back its wood-using industries, and woodworking communities provide more permanent springs and streams and thereby have fewer floods and droughts, have more fish and game, give the people forest playgrounds, utilize the now idle acres for financial profit, and thereby help build up the agricultural industry.

"Here in Springfield is the great fine paper manufacturing district—with Holyoke the greatest center of fine paper manufacturing in the world. More than 95 per cent of all the paper produced in this country is made entirely or in part from wood. By restoring the pine and hardwood forests it would be possible to relieve the drain on northern New England and New York, so that those states could provide the fir and spruce needed by the paper mills. The paper mills are often charged with devastating the forests, yet they use only 4 per cent of the total wood cut of the country. As a matter of fact, the paper industry is today doing more than any other wood-using industry to promote forestry."

Permanent successes are made by men who have plugged away, tried, failed, and then tried again.

Actual Comparisons of Special New Soft Rubber Rolls with Former Rolls Used

Through the courtesy of Hammermill Paper Company, S. D. Warren Company, Michigan Paper Company, Fletcher Paper Company, and others.

Machine Width, in		94	110	100	128	100	132	111	150
Machine Speed, f.p.m.		100-250	400	400	265	400	450*	390	800
Kind of Paper		Book	Bond	M. G. Wrap.	Folio Tablet	Sulphite Bond	Bond	Wrapping	Newsprint
Diameter Roll, in.		18	20	20	20	20	20½	20¼	25¾
Thickness Cover, in.		21/32	¾	1	¾	1	1	⅝	1½
Hardness of Rubber	H. Speed News	92	95	96	95	93	94	96	100
	Former Cover	60	65	49	45	54	57	(Hard)	70
Diametrical Crown	H. Speed News	0.036	0.040	0.040	0.035	0.043	0.048	0.040	0.080
	Former Cover	0.030	...	0.033	0.025	0.025	0.040	0.024	0.065
Total Pressure Lbs.	H. Speed News	8,000	No	13,000	10,000	13,000	18,000	Less with H. Speed News	Same
	Former Cover	8,000	Change	13,000	10,000	13,000	18,000		
Water Removed %	H. Speed News	As much or more with H. Speed News	Same	Same	Same	11.4	Same	Approx. Same	0.75 less with H. Speed News
	Former Cover					11.1			
Felts Washed Hour	H. Speed News	144	24	Same**	24	Same**	Same**	36	96
	Former Cover	72	12		12			24	30
Felts Lasted Days	H. Speed News	Not determined	30	40	40	34	40	24	Satisfactory
	Former Cover		24	26	24	28	30	18	10

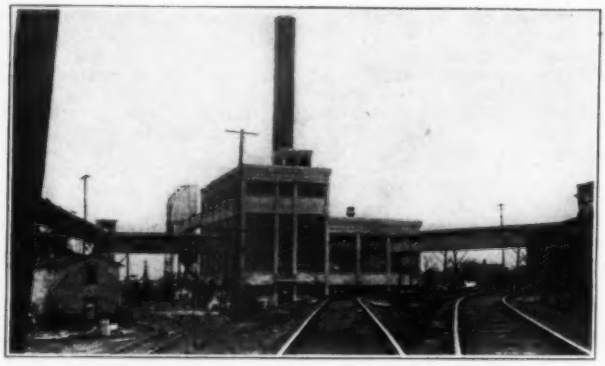
*Speed with previous roll was 400 f.p.m. **No attempt made to cut down washing. These rolls have been in service for an average period of 4½ months.

Bryant's New Boiler Plant

WITH the completed propositions, 50 to 60 per cent saving in coal and the same percentage in labor-saving are the figures arrived at by the Bryant Paper Company of Kalamazoo, Mich., due to the erection of a central steam plant, which will serve all four of their divisions with steam and electric power and light. Although all equipment has not yet been installed, enough has been done to furnish the Bryant, Imperial and Superior Divisions with steam and electric power and light.

The plans, specifications, supervision and construction of this new boiler plant were conducted by V. D. Simons, Industrial Engineer, and his organization at 39 South LaSalle street, Chicago.

The plant is located between the Bryant and Milham divisions, directly across the street from Bryant and across the tracks from Milham. Two overhead steam lines carrying both exhaust and high pressure and condensate have been installed, one running to the Bryant division and the other running to Milham, Imperial and Superior divisions, although Milham is not to be supplied with steam until later. This latter exhaust pressure line totals 700 feet in length, starting with a 30-inch line to the Milham division, a 20-inch line from Milham to Imperial and a 16-inch line from Imperial to Superior. Heat loss has been reduced to a minimum through covering the line with 2½-inch Nonpareil blocks and protected by a weather-proof jacket. The fact that snow and ice stay on this pipe line without melting, the same length of time that it does on all surrounding objects, proves the effectiveness of this insulation.



Bryant Paper Co's. New Steam Power Plant

The building is a concrete structure, 111 feet by 103 feet. The boiler room is 77 feet and the engine-room 54 feet high from the ground level.

Mechanical Coal Handling Results in Big Labor Saving

The enormous coal and labor saving is due to the modern labor and fuel saving equipment which is installed and to the heat balance that will be effected. Coal is not touched by human hands from the time it comes into the yard on the cars until the time it is carried away in ash. The coal is loaded into cars at their large coal pile by a locomotive crane. The coal is dumped into a hopper at the bottom of the coal hoist tower. A skip hoist brings the coal to the top of the tower, where it is emptied into a crusher and from the crusher passes onto an endless belt to the bunker over the boilers, which holds 450 tons. This coal hoist tower, to allow for boiler house expansion, is located approximately 125 feet from the boiler house proper. This expansion will be the installation of four more boilers to take care of the steam power requirements of the Milham division.

Four underfeed multiple retort motor-driven stokers with extra long dumping grates to give the coal ample time and space to be entirely consumed before it is dumped into the ash hoppers take the place of the worn-out and less modern equipment of the old plants. The coal is automatically weighed as it passes from the bunkers to the chute leading to each stoker. There are four forced draft motor-driven fans located in the basement, also two induced draft fans located in the economizer room. A control system is used for maintaining any pressure at which it may be set. It automatically provides air under pressure necessary for any condition of fire; it also maintains a definite vacuum over the fire. It controls the speed of all the fan and stoker motors.

Ash Handled Same Way as Coal

The ash is dumped into cars which are weighed before being emptied. It is taken back to the coal hoist tower by means of a small electric tractor and is dumped into a bin located underneath the track. A skip hoist takes the ash to the top of the tower and dumps it into a chute which leads to a large elevated steel tank built within the tower. Here it is held until cars are available to take it away. It is loaded into cars or trucks through a chute. In the event of the coal hoist being shut down for repairs, coal may be conveyed to the bunkers through the ash hopper and hoist skip.

The boiler installation consists of four 778 hp. Stirling boilers designed for a pressure of 300 pounds and provided with superheaters for raising the temperature 200°. Normally these boilers will be operated from 175 to 200 per cent of rating; however, they are capable of 350 per cent; in fact, two of them have been operated at the latter rating.

Three boiler feed pumps are provided, one motor-driven centrifugal pump, one steam turbine driven centrifugal and one duplex reciprocating steam pump. The water system for the plant includes a water filtering and softening plant having a capacity of 36,000 gallons per hour. The feed water system is designed to provide hot process water as well as water for the boilers.

The treated water is augmented by condensate returns and obtains its heat from this source and is brought up to a temperature of 125 degrees by passing through a closed heater. It is then passed through two large economizers which brings it up to a final temperature of 225 degrees. The economizers were installed for general process water heating purposes as well as that of boiler feed.

Instruments showing feed water temperature, flue temperature, steam temperature and a draft gauge and flow meters are placed adjacent to the boilers and additional recording meters are situated adjacent to the engine room panel board so that the fireman in charge can immediately note the condition and results that he is obtaining.

The engine room is equipped with a twin uniflow engine running a direct connected generator with a capacity of 2,500 KV.A. A 500 KV.A. turbo-generator has been installed as an auxiliary unit for Sunday and holiday power. The control and operating board is situated here and contains meters and switching apparatus, both steam and electrical units, for the entire plant. An overhead traveling crane is installed for the purpose of erecting and handling machinery parts.

This central boiler plant takes the place of the smaller plants in each of the four divisions and through this centralization and by means of the greater economies due to large operation and the mechanical equipment installed, which make possible such material savings.

So far, 30 of the old vertical Wickes boilers have been shut down and within the next few months they are all expected to stop running and will depend entirely upon this one main boiler plant. Many improvements are contemplated throughout the Bryant mills after the old boilers have been taken out.

Whole Plant Runs Smooth, Clean and Quiet

Soot, smoke, noise and commotion are conspicuous by their absence in this plant. As one goes through the boiler-room and watches the quiet running mechanical stokers and then steps out into the engine-room and sees the two giant uniflow engines running smoothly and noiselessly, he is immediately impressed with the quietness and order of things. And then when he takes a look at the pressure gauges and recording instruments and sees what a stupendous amount of steam and power is being generated in this peaceful atmosphere it makes more than an impression—he is overwhelmed by the thought of it. Here in a building as quiet as any schoolhouse 175,000 pounds of steam and 2,500 K.W. of electricity are continually being generated. Look where you may, you do not see a power house that will beat this in simplicity, cleanliness and results.

The following firms furnished equipment for this new power plant:

Coal handling equipment, Beaumont Company; coal conveyor belt, Goodrich Rubber Company; stokers, Combustion Engineering Corporation; ash scales, Fairbanks Scale Company; forced and induced draft fans, Clarage Fan Company; stoker and fan motors, Westinghouse Electric Company; soot blowers, Diamond Power Specialty Company; boilers, Babcock & Wilcox; superheater, Babcock & Wilcox; economizers, Green Fuel Economizer Company; feed water pumps, Worthington Manufacturing Company; duplex reciprocating steam pump, Worthington Manufacturing Company; feed water heater, Patterson-Kelly Company; centrifugal boiler feed pump, A. S. Cameron Steam Pump Company; grease extractor, Griscom-Russell; water softener, Permutit Company; steam traps, steam separators, blow-off valves, non-return automatic stop and check valves, safety valves, miscellaneous steam and water valves, piping, Crane Company; steam flowmeters, Republic Flowmeter Company; recording thermometers, Taylor Instrument Company; diaphragm valves, Taylor Instrument Company; pressure gauges, Republic Flowmeter Company; duplex uniflow engines, Nordberg Manufacturing Company; steam auxiliary turbine, Allis-Chalmers Company; generators, Westinghouse Electric Company; steam line insulation, Smith-Tatman Company; traveling overhead crane, Whiting Corporation; electrical generating room equipment, Westinghouse Electric Company.

New Protection Against Rust

The value of a proper asphalt in protecting steel from the attacks of acids, acid fumes and corrosive gases is well known and generally recognized. The problem has been, however, to find a means of depositing such an asphalt on the metal economically, without special heating equipment and without highly skilled labor.

This problem heretofore regarded as impossible, is now claimed to be solved by Gardiner & Lewis, Inc., 30 Church St., N. Y. C., manufacturers of water-proofing and roofing. The solution consists in the emulsification of asphalt with water. The asphalt is, by a unique process, broken up into extremely minute particles in the presence of water, the water acting to suspend the asphalt particles and to hold them apart. The resulting product is a creamy paste-like substance, readily spread on the steel or concrete surface with a brush or spray. When so spread, the water evaporates and the asphalt particles flow together and unite, forming a continuous asphalt sheet, exactly as if the asphalt had been applied hot with a mop.

The name Krodeproof has been given this solution. No asphalt solvents of any sort are used in its manufacture. It is solely a matter of suspending particles of a known asphalt in a water medium so that as the water evaporates, all of the values and protective elements of the original material are left unaltered and unimpaired.

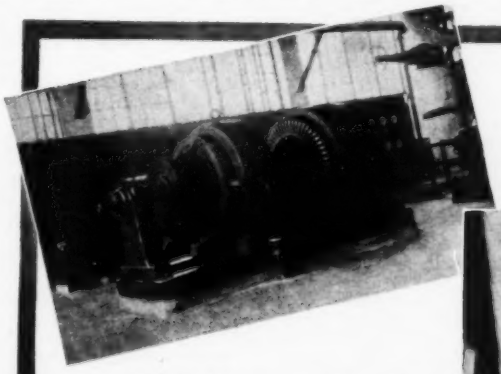
In general, it is claimed that wherever protection is required against moisture, steam, acid or alkali fumes, under such conditions that decorative values are negligible, Krodeproof will give most effective service.

Exhibitors Grab Space for Next Chemical Exposition

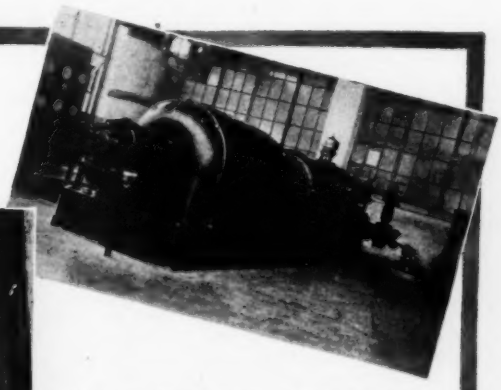
Reports for the Tenth Exposition of Chemical Industries, which will be held at the Grand Central Palace, New York, during the week of September 28th to October 3rd, 1925, state that all exhibit space on the main floor has been contracted for by chemical and chemical equipment companies; that most of the second floor has been taken, as well as a portion of the third floor.

With the Tenth Chemical Exposition more than a year ahead, greater space has been taken for the 1925 Exposition thus far than for the 1923 Exposition at the same time last year.

A change in name from The Hill Clutch Company to The Hill Clutch Machine & Foundry Company, Cleveland, Ohio, has recently been effected. They are manufacturers of power transmitting equipment, special machinery and gray iron castings.



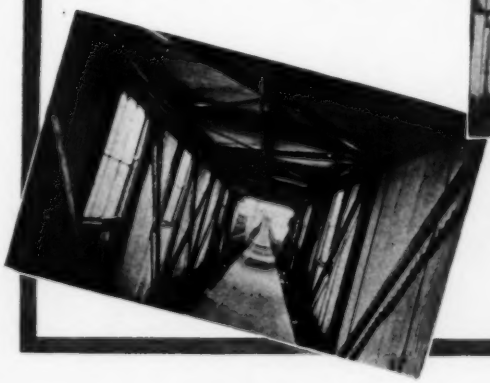
Above—Westinghouse motor generator set producing D. C. power for motors, etc., in the new steam power plant of the Bryant Paper Co.



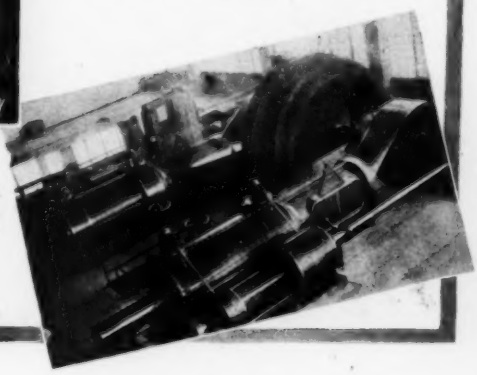
Above—Allis-Chalmers steam turbo generator in Bryant Paper Co's. new power plant

Below—Coal Conveyor installed by Beaumont Co., using B. F. Goodrich conveyor belt

Below—Nordberg engine and Westinghouse generator in the Bryant Paper Co's. new power plant



Above—Boiler room of Bryant Paper Co's. new power plant, Beaumont bunker and coal handling equipment, Frederick stokers



The Safest Paper Mill Crew in the World

Kimberly-Clark Makes Record Run of 97,500 Man-days Without an Accident

AN OFFICIAL of the Kimberly-Clark Company recently received a letter from a former employee, containing this paragraph:

"If there is such a thing as a safety complex, the Kimberly-Clark organization—and especially the Niagara mill—sure has a severe case of it. I am as proud of the record Niagara has made as if I were still in the organization."

The above comment fairly reflects the spirit of safety which has taken possession of Kimberly-Clark under the direction of M. G. Hoyman, safety director.

The Niagara plant, employing six hundred and fifty-three men, with an accident record only a few years ago of twelve to fifteen per month, finished 1923 with but five accidents causing loss of time. To cap the climax, they made a straight run of 150 days (97,500 man-days) with no accidents whatever.

The management and men of the Niagara plant, in view of this record and being unable to discover a groundwood, sulphite and paper unit of like size with a safety record touching theirs, lay claim to "The Safest Paper Mill Crew in the World."

Safety Challenge Cup

About a year ago, a Safety Challenge Cup was put up by the management of the company for competition between the three major plants, namely, Kimberly, Niagara Falls, and Niagara, Wis. Niagara won the first sixty-day heat with a clean slate, then repeated the performance over a second sixty-day stretch. Niagara Falls, coming from behind, captured the third heat and followed in with a second win during the fourth sixty-day period. Permanent possession of the cup was to come with the third leg on the cup, and this Niagara, Wis., secured on the night of November 30, 1923, with a third sixty-day stretch free from any lost time injury. In recogition of this achievement, the accompanying photographs were made, and on December 9th, a Safety Jubilee was held with a mass meeting in the auditorium of the Community House, addressed by Mr. F. J. Sensenbrenner, first vice-president of the company, who made formal presentation of the Challenge Cup to the men of the Niagara plant.

Intelligent, Enthusiastic Safety Leadership

Results such as these require leadership—earnest, enthusiastic leadership. Every department head of the Kimberly-Clark Company is thoroughly sold on Safety. In addition to this, the foremen's organizations of the three major plants have majored on Safety. The reason why Kimberly-Clark Company inter-mill contests have brought such outstanding results finds its answer in the sporting element introduced by challenges of one group of foremen to another. Too often Safety contests have been superimposed by the management and, when so started, are uniformly disappointing in their results. On the other hand, when a foremen's organization, of its own volition, issues a challenge to another foremen's organization, the matter takes on a different aspect. Pride in accomplishment asserts itself. The urge then comes from the inside out and Safety becomes a vital issue.

In the olden days, a dozen accidents might occur in a month and nothing was thought of it. Today a lost time accident in the Kimberly-Clark Company causes as much commotion as a fire.

Proper Records Help

Right psychology has more to do with accident prevention than guarded machinery. In the Kimberly-Clark Company, Safety records rather than accident records are featured. The weekly chart magnifies, in terms of each foreman, the number of actual days his crew has run without injury, the total consecutive safe man-days to date, and his best previous record in safe man-days. At the top of each weekly plant

Members of the Niagara Foremen's

Safety sheet is the total days the whole plant has gone without accident.

Every red-blooded foreman takes pride in seeing his Safety total accumulate and by the same token has no desire to be the foreman responsible for bringing the total consecutive safe days for the plant back to zero.

By-Products of Safety

For years, the Kimberly-Clark Company has carried its own accident liability. The first result of their successful Safety campaigning has been a substantial saving on this account.

Still more important, however, is the team work and morale which develops through an organization of six hundred and fifty men which can run, say, 150 straight days without injury of any kind. Men take pride in their work, give more allegiance to their leadership, and the reflection through the whole community life is beneficial. At Niagara, the entire community caught the Safety spirit and, during the year 1923, there were fewer accidents of all kinds through the village than occurred in the mill. The two doctors would starve to death if they were dependent upon mill or community accidents for their livelihood.

Safety in the Use and Care of Saws *

By S. HORACE DISSTON
Vice-President, Henry Disston & Sons, Inc.

MODERN industrial development, with its demand for greater and still greater production, is entirely responsible for the fact that there is a safety problem in connection with the use of saws.

The saw is one of the earliest of tools. Saws have been in use from the beginning of history. But the man of the Stone Age, with his flint saw, working all day to cut through a two-inch tree-branch, had no safety problem. It is in modern times, when saw users are demanding cuts of 200,000, 300,000, 400,000 feet or more of lumber in a single day, that we are confronted with a safety problem in connection with the use of saws.

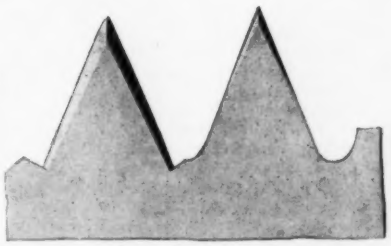
It is fascinating to trace the history of the saw, from the flint saws of the Stone Age Man, through the hand saws of the Bronze Age, the more efficient cast metal saws of the Egyptians, and the first power saws, driven by water power, which cut vertically, down to the highly developed circular and band saws of the present day.

History of the Saw

Some of the early flint and bronze saws have come down to us, and it would not be surprising if King Tut's favorite hand saw should be found in his tomb—for in those days saws were a treasure.

A manuscript of the 13th century shows the first water power saw-mill. In 1663 a Hollander erected the first saw-mill in England, but had to abandon it because of riots among hand sawyers, who feared the loss of their livelihood. More than a century later, in 1768, another saw-mill was erected.

Crack in saw resulting from square gullet, shown at "D"



Examples of correct and incorrect bevel on saw teeth. Incorrect bevel shown at the left, correct bevel shown at the right

America's first saw-mill was built at the Falls of Piscataquqa, on the line between Maine and New Hampshire, in 1634. Saw-mills were used in Virginia as early as 1650. The circular saw was introduced in England about 1790, and the first circular saw in this country is said to have been pro-

*Presented at the mid-year safety conference of the National Safety Council's Engineering Section, in Chicago, February 19, 1924.

Club whose teamwork put it across

duced by a country blacksmith—Benjamin Cummings—at Bentonsville, New York, about 1814.

America developed the general use of circular saws for manufacturing lumber. Two Maine Yankees patented a saw-mill in 1820 which produced as much as 1,200 feet of lumber a day—a great output for those times. The saws used on these early mills were crude round sheets of metal, hammered flat on an anvil, with roughly punched out teeth.

Appearance of a saw that has lost its tension. Notice the space between the straight edge and the rim of the saw

The next development was the invention of the gullet tooth saw—a saw having round gullets, providing larger saw-dust chambers and so reducing the liability of breakage.

Next came the inserted tooth saw, also known as the chisel tooth saw, which provided a way to replace the teeth when worn, without reducing the diameter of the saw. The difficulty with the early inserted teeth was that there was no really satisfactory way of holding the teeth in place. However, this difficulty was overcome later, and progress in this field became rapid.

The perfection that has been attained in modern saws of this type is shown by the most recent development in inserted tooth saws. This type of saw is known as a "log" saw and is used to manufacture lumber from logs.

Circular saws of the inserted tooth pattern also have been developed for the cutting-off of logs. We have manufactured saws of this type as large as 108 inches in diameter for use on the Pacific Coast. These are the largest circular saws ever made. With the old-time saws, running at low speeds, one did not require the factor of safety needed in the modern high speed saws. These 108 inch saws, weighing 795 pounds each, are made to operate at a rim speed of 130 miles an hour. Just as the circular saw was developed step by step, so was the band saw. The first endless band saw was patented in 1808.

In 1876, at the Centennial Exposition, we exhibited a bandsaw six inches wide. This saw was considered a wonder at that time—both in size and speed. Today the standard widths of band saws range from 10 to 16 inches. They average from 44 to 68 feet long and travel at a speed of from 7,500 to 10,000 lineal feet a minute.

Circular saws for wood, both solid and inserted tooth, should run at a rim speed of about 10,000 lineal feet a minute.

Speed Law for Saws

In the state of California there is a law governing the speed of circular saws, which states that the operator must confine his speed as nearly as possible to the standard of 10,000 feet rim motion a minute. The law allows a variation in excess of this speed of ten per cent, to take care of the difference between direct drives, which are positive drives, and belt drives.

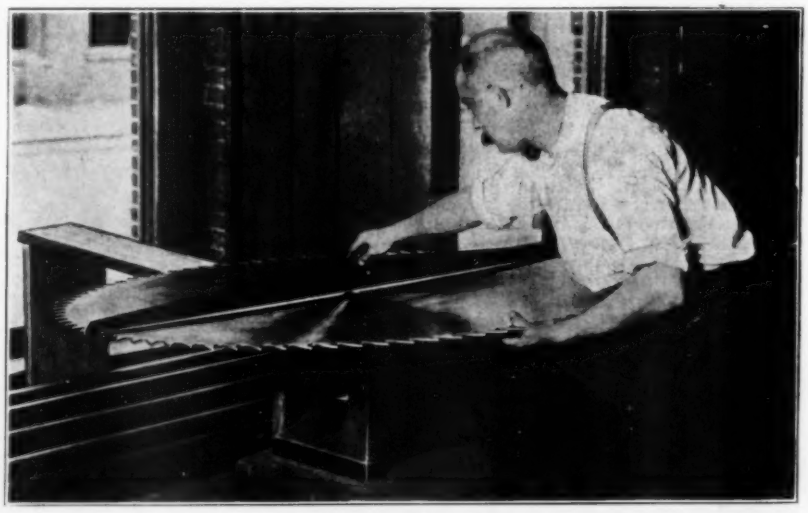
Unless otherwise ordered, saw makers put into saws the proper amount of tension for this speed and there is danger in operating circular saws in excess of 10,000 feet rim motion a minute. For example, we recently had occasion to call on a manufacturer of wood-working machinery who was using our saws on his machines. This manufacturer complained that our saws cracked. Upon investigation, we found that they were being run at a much higher rate of speed than was specified. This caused the cracking. It will be seen from this that it is necessary and important that saws be operated at the speed for which they are tensioned.

What has been said regarding speed of circular saws, applies also to band saws—particularly the wide band saws that are used in large lumber mills of the country for manufacturing lumber from logs. These saws, from 10 to 16 inches wide, 44 to 66 feet long, are very thin, ranging from 16 to 11 gauge in thickness. They travel over two pulleys from 7 to 10 feet in diameter at a speed varying from 7,500 to 10,000 lineal feet a minute, running under a very heavy straining device.

It has taken years of experience in the manufacture of steel, as well as experience of practical men in the manufacture of saws, to bring them up to the present point of efficiency so that they will maintain this rate of speed in perfect safety. In the interest of safety and efficiency, proper speed is very important, but there are other thing that enter into the operation of saws that should have consideration.

Tension Requirements

Tension is one of the very important operations in the manufacture of saws. All saws, if properly made and properly tensioned, are what we call "open" through or toward the center to suit the speeds and kind of work for which they are intended. The object is to keep the edge strained or tensioned on a straight line so as to prevent the saw from chattering, or cutting a zig-zag kerf through the timber.



Appearance of a saw that has the correct tension. Notice the space between the straight edge and the center of the saw

Proper tensioning is an important factor of safety because a saw not properly tensioned will not follow a straight line in the cut and this sometimes causes cracks and other damage to the saw, possibly injuring the operator or the machine.

We have known of cases where attempts have been made to

operate saws after cracks have appeared. This is a dangerous practice. There is a law on the statute books of the State of Washington governing the operation of saws that have cracks in them.

A saw may gradually lose its correct tension in service. Then it requires hammering by hand, just as is done with new saws, until it has been restored to its original condition. As a measure of safety, none but experienced and competent workmen ever should be allowed to tension a saw. Many accidents have been caused by the failure of saw operators to observe this precaution. This also applies to the sharpening and setting of teeth. Experienced, competent men should do this work.

Improper Sharpening Causes Breakage

One feature in connection with the sharpening of the teeth of circular saws which causes a considerable amount of breakage, is the filing of sharp corners or nicks in the bottom of the gullets.

Another thing that may cause breakage, is the practice of running a saw with too much set to the teeth. The set should be just sufficient to permit clearance. If it is increased beyond this point, too much strain is placed on the rim of the saw, forcing the teeth apart sidewise. This not only destroys the tension of the saw, but is liable to fracture the blade.

Again, we have cases where the teeth are filed with too much bevel. This usually causes the saw to take too deep a bite on the material to be cut. It increases the strain on the rim of the blade and may cause breakage of the teeth.

Another practice to be avoided is that of carrying too much hook, rake, or pitch on the face of the teeth. This also causes the teeth to take too much bite on the material being cut and may result in broken teeth.

Operating saws with dull teeth has resulted in accidents. Dull teeth do not cut through the material as fast as it is being fed to the saw. This usually results in the saw being forced over the collars, and, in some cases, breaking around or near the collar line. Care should be taken to avoid case-hardening in the sharpening of saws with emery wheels. This applies to both circular and band saws.

Operators should take particular care to see that the collars on the arbors of machines on which circular saws are used are true, and that only the outer edge of the collar comes in contact with the saw when tightly clamped in position.

In some instances, we have discovered that the inside of the collar has not been machined out properly, thereby causing a bearing on the inside of the collar line. This forces the rim of the saw out of line, so that when it comes in contact with the timber, there is produced a buckling effect on the saw, causing it to heat both on the rim and near the collar line, and in some instances causing breakage. It is important, not only to insure the best service, but as a matter of safety, that the saw be in perfect alignment with the timber to be cut so that it will run entirely free in the cut.

Another condition which repeatedly causes trouble is due to an accumulation of sap or gum, permitted to remain on the band saw blade. Such accumulations, continually carried over the wheels by the saw, forms uneven places on the surface of the wheels, places an uneven strain on the saw, and may cause breakage. Then, of course, there are accidents which are due to carelessness on the part of the operator or other employees.

For instance, in a Southern saw-mill, an operator rolled a log against the side of a band saw. Fortunately, the saw did not break. (It is interesting to note here, that the steel used in these saws will withstand not less than 200,000 pounds of pull to the square inch.) However, the saw was so greatly strained that when it was taken off the wheels, it coiled four times around itself.

The manufacturer is doing all in his power to promote the cause of safety with saws, and a great deal has been accomplished; but, after all, the final responsibility for safety lies with the operator, just as it does in the case of all power machinery.

Private Timber Owners in Maine Assisting in Bud-Worm Study

Arrangements have been perfected for including H. B. Pierson, State Forest Entomologist of Maine, and his assistant, J. A. Beal, as temporary members of the staff of the Northeastern Forest Experiment Station, Forest Service, United States Department of Agriculture, announces Director S. T. Dana. This has been made possible through contributions from private owners interested in the work, which have been turned over to the Forest Service as a co-operative fund.

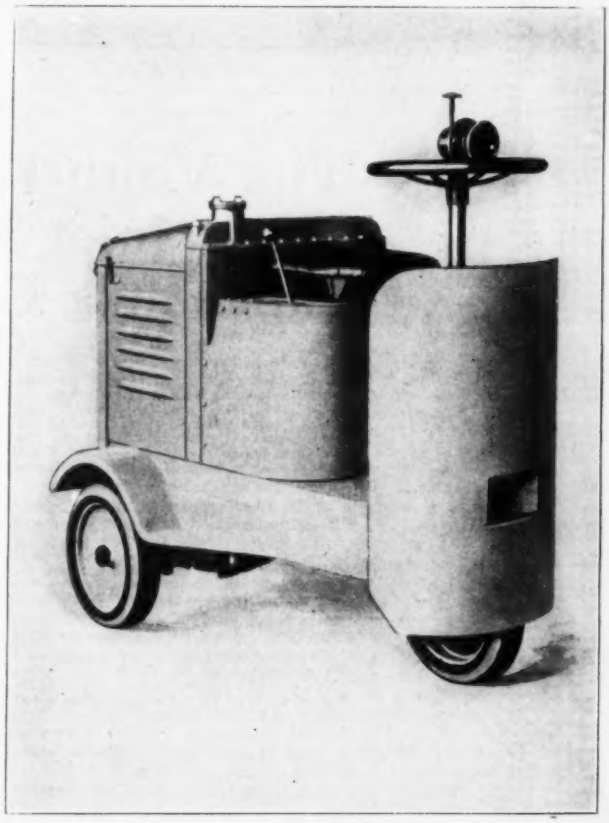
The work will continue chiefly in Maine, and will deal principally with the study and suppression of the ravages of the spruce budworm, which has killed the pulp timber on thousands of acres of timberland in the Northeast and in Canada in the past few years. Federal forest entomologists will assist under a co-operative agreement also perfected with the Bureau of Entomology of the Agricultural Department. The combined field work will be under the technical direction of the Bureau of Entomology.

Mr. Dana states that Mr. Pierson's work in these investigations has been and will be of vital importance to the timber interests in Maine, and to the cause of forest conservation. That results of real value have already been attained and are appreciated, is shown by the contribution of more than $8,000 which private owners have willingly provided for this work in order that it may go on.

Combinatino Crane Truck and Tractor

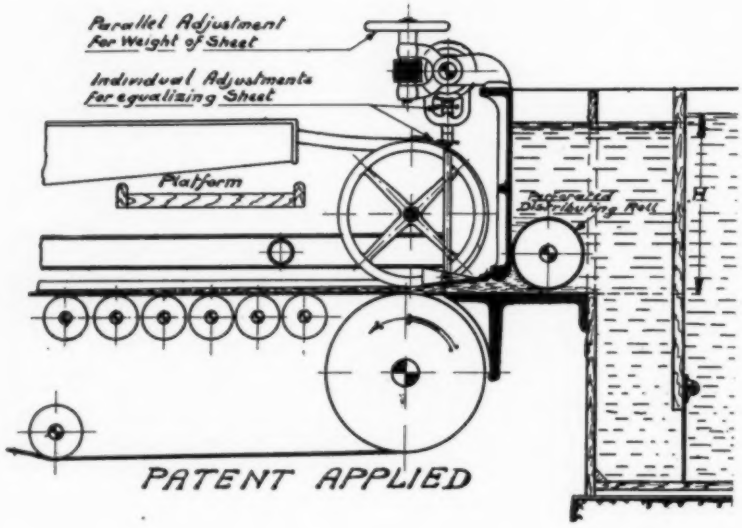
What is claimed to be the smallest industrial truck and tractor ever built is the "Duat," made by the Clark Tructractor Company of Buchanan, Mich. This "tructractor" is a compact, 3-wheeled gasoline powered mobile crane, truck and tractor. It pivots on one wheel and has a turning radius of but 52 inches. It turns around in a box car and is an inexpensive general utility haulage unit.

The "Duat" tructractor tows from seven to ten tons or from one to twenty trailers, depending on the condition of the factory floor or yard. Through an ingenious device, a one-ton crane is attached to it without the use of tools, in



less than five minutes, converting the "Duat" into a mobile crane. The crane attachment will lift and carry loads up to 2,000 lbs. A brake device permits the load to be carried at any height up to 56 inches; load may be lowered at will. The machine has been designed for the loading and unloading of box cars, the lifting and towing of loads through narrow aisles, and for inter-plant haulage.

Ample traction is provided by 16-inch wheels equipped with 3½-inch solid rubber tires. It has a wheelbase of 40 inches with a tread of 33 inches, and will enter and turn around in a freight car. A brake beneath the driver's seat which automatically stops the machine when the driver dismounts is a safety factor.



The Voith High Pressure Stock Inlet Makes Better Paper at a Greater Speed

1. It Assures Paper of Uniform Caliper

Ordinary slices on a Fourdrinier machine result in forming a contraction when the stock is injected onto the wire. This causes irregularities in the caliper of the paper across the trim of the machine. The fine adjustments easily made on the Voith Inlet makes a sheet of uniform thickness across the entire width of the machine.

2. It Eliminates Foaming

Because of the contraction when the stock is injected onto the wire, the paper being heavily sized, there is a great deal of foaming. The Voith Inlet feeds the stock evenly onto the wire which eliminates this contraction and the consequent foaming.

3. More Surface for Formation on the Wire

The long apron and slices usually used are eliminated by the Voith Inlet. This gives an additional surface of two to three feet on the wire for formation purposes and results in a better sheet.

4. Wires Last Longer

By doing away with slices it is unnecessary to build up a head of stock on the wire itself, thus saving wear and tear on the wire and insuring a longer life.

5. Cumbersome Deckle Washing Pans Eliminated

The Voith Inlet has a deckle washing device which washes the deckle at the point of the deckle pulley, thus eliminating the cumbersome pans on the machine itself.

6. Inlet Easy to Operate

Because it is easy to operate and adjust, it appeals strongly to the machine tenders and the operating force in the mill.

7. The Machine Can Be Speeded Up

It makes possible the speeding up of the machine, and increases production. In one mill this amounted to ten percent, in another mill 20%.

Write for Further Particulars

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The Vacuum Paper Machine Dryer*

By OGDEN MINTON,
Greenwich, Conn.

IN THE early days, paper was made by hand. The paper maker dipped a hand mold into paper stock, covered the wire with it, and shook or rocked the wire until the water drained out. He then placed a felt over the mold, pressing it down until the paper stuck to it. This process he repeated many times, until a large number of felts, with paper on them, were accumulated. These were then put in a press for the purpose of removing more of the water from the paper. Some of the water drained off, and some was absorbed by the felts. Lastly, the paper sheets were separated from the felts and hung on poles to dry.

The very highest grade paper can be and still is made in this way, although in very limited quantities, to be sure, because of the high cost of the hand operation.

The first improvement of large importance in the art of paper making is marked by the advent of the Fourdrinier Paper Machine, with which paper makers everywhere today are familiar. Surprising as it may seem, pictures and cuts of the very first Fourdrinier type of paper machines show them to have been quite similar to present day type of paper machines. Some of the very oldest machines had suction boxes, couch rolls, felt presses, and a bank of dryers. The author of this article has talked with a veteran paper maker who told him of building and keeping fires going inside the "cans" as he called the dryer cylinders. It was not a far step from the fire to steam within the dryer cylinders, and the addition of dryer felts was a natural development in view of the necessity of passing the paper over a large number of dryers and of keeping the paper in tight contact with the dryer shells. From the introduction of the Fourdrinier machine to this day there has been little change in the process of drying paper. That was over seventy years ago. It is true that modern high speed paper machines have many, and large, dryers and that they run at high speeds. Moreover, the drying process has been hastened by blowing large quantities of heated air through the bank of dryers to better absorb and carry away the vapors formed. But in principle and in practice it is essentially the same old-fashioned process. While the blowing of heated air through the bank of dryers has hastened the drying and allows the machine to be run faster, it has actually lowered the thermal efficiency of the process of drying. This can readily be shown by a heat balance of a paper machine equipped with blowers, hoods, etc., and one not so equipped. The real old machines, strange as it may seem, were more efficient in so far as making use of the heat supplied to them.

By way of improvement of the modern machine, it would appear to be advantageous to raise the temperature of dryer shells to a much higher temperature than is commonly now done, and thereby to dry paper more rapidly and with fewer dryers. But it is not possible safely to raise the pressure of the steam (and therefore the temperature) much over 50 lbs. because of the insufficient strength of the dryer cylinders. Also paper makers have learned that high temperatures injure the fibers of the paper and that paper dried at a high temperature is not as strong or as good in many ways as when dried at lower temperature.

Seals for Vacuum Paper Machine Dryer

It occurred to the author that some way could be found of drying paper at low temperatures and yet drying it rapidly. The only method he knew of was to dry it under a high vacuum. He was familiar with the process of drying sugar in a vacuum and knew also that chemists have for a long time made use of a vacuum when they desired to dry delicate materials without injury. Accordingly he set out to develop a Vacuum Paper Machine Dryer. The problem soon simmered down to a method of getting paper into and out of a vacuum chamber continuously without breaking the vacuum. The manner of applying heat to the paper after it was once in the vacuum was simple, as present drying equipment could be used for this purpose. The problem then was to devise an ingoing and outgoing seal that would allow the paper to pass into, and out of, a vacuum chamber, in which chamber present drying equipment could be placed. Many different forms of seals were experimented with. The first successful seal was a mercury column, through which the paper passed into and out of the machine. As far as sealing was concerned, the mercury seal performed perfectly. Mercury, however, was found to be difficult to handle, easy to lose, and expensive. Eventually a seal not having the above disadvantage was perfected. The drawings No. 481, 482 and 483, showing this seal illustrate how simple the latest type of this seal has really become. The great problem was to make the seal so efficient as to keep air from entering the vacuum chamber where it rapidly expanded and became costly to pump out. The feasibility of packing long rolls like a stuffing box was early abandoned as the friction was found to be too great. This friction could not be relieved by lubrication because the lubricant would cling to the roll and be carried onto the paper. After working with seals of many different kinds, it was learned that to allow water to leak into the vacuum chamber was not at all objectionable since the water was needed for the condenser and eventually had to be supplied anyway. The present type of seal takes advantage of this fact. Instead of allowing air to leak into the vacuum chamber, water is allowed to leak in, after which it is lead directly to the condenser.

The present seal consists of two bronze covered rolls, with special sealing rings at their ends, a rubber covered roll with similar sealing rings at its ends, and a cast iron housing equipped with grooves into which is placed rubber tubing ¾ inch in diameter, with a ¼ inch hole in the center. Water is supplied as a sealing medium and also acts as a lubricant to the rubber. The two bronze rolls, as shown in the drawings, have one side immersed in water. Water leaks past the rubber tubes into the vacuum chamber, but because the vacuum holds the rubber tubes tight against the roll and the housing, the quantity of water that thus leaks past the tubes is very small. The second rubber acts much like a window wiper and wipes the roll dry so that its surface coming in contact with the paper is at all times dry and clean. If the proper kind of rubber is used, water forms almost a perfect lubricant and the friction is so low that it is not an important factor. Results of tests show that rubber, lubricated with water, makes an excellent bearing material. This fact only recently discovered and not yet generally known, we have taken advantage of in designing these seals. In fact one of the large rubber companies has put on the market a bearing of this type for pumps, shafting, etc., which is giving exceptional service. The wear on the rubber tubes is very slight, but provision has been made to quickly replace them when they do wear down. In the machine shown in the photographs the rubbers have never yet been replaced and their length of life is therefore not known.

Air cannot leak into the vacuum chamber because it must displace the water ahead of it which, of course, it cannot do as long as a constant supply of water is kept in the opening and maintained at the same level. This level is maintained by additional water running in slightly faster than needed, the excess flowing away to waste or to the condenser over a small weir. The rubber surface of the rubber roll runs on the two bronze rolls and the vacuum holds it down air tight. The surface of the rubber, however, will give enough to allow the paper to enter or leave the vacuum chamber without allowing air to enter. The pressure of the rubber covered roll on the other roll can be regulated by means of bearings on the ends of the rubber roll which can be adjusted up and down. Practice has shown, however, that this adjustability is unnecessary as the atmospheric pressure happens to be not too great and the rubber roll does not press sufficiently hard to hurt even the most delicate paper. The ingoing seal has somewhat the same effect as a pair of smoothing rolls and if additional pressure were applied to them they would have this effect in increased degree. This seal flattens the ingoing sheet of paper and helps to remove wire or felt marks. The cross section drawing illustrates how the paper passes through the bank of dryers and out through the outgoing seal, which latter seal is identical with the ingoing seal. The ends of the three sealing rolls are fitted with cast iron rings which run against the side frames and are lubricated. In the case of the two bronze rolls a rubber gasket is mounted behind these iron rings to keep them tight against the side frames. The rubber surface of the rubber covered roll furnishes sufficient pressure to keep the rings at its ends tight against the side frames. This pressure is but slight and the rings are water cooled by the incoming water. The rings and side frames soon take on a high polish, like a piston ring in a steam engine, and the friction is negligible.

Mechanical Considerations

An examination of the accompanying drawings of Vacuum Paper Machine Dryers discloses the ingoing and the outgoing seals, the cast iron chamber, the series of dryers, felts, with felt carrying rolls including hand and automatic take-up rolls and hand and automatic guide rolls. The seals have been explained above and their construction is clearly shown in the drawings. Ball bearings are fitted on all the sealing rolls. By taking out nine cap screws on each side frame of the seal and eight rubber tube holding plugs the side frames, together with the three sealing rolls, may be lifted off the ma-

*Presented at the Annual Convention of the Technical Association of the Paper Industry on April 8, 1924, at New York City.

The Corrugated Type Bucket

The Ore Type Bucket

Seamless Steel Buckets for Durability and Service

Assure Clean Delivery of Material

THE Caldwell Seamless Steel Bucket is an exclusive Caldwell product. It was designed to dump the material it is elevating and conveying—cleanly.

The corrugated type, illustrated, is used exclusively for handling light material, grain, cottonseed, flour and similar products.

The heavy bucket, called the Ore Type Bucket, is used for coal, sand, ore, white lead, and similar material.

Both buckets are made from one piece of steel, pressed into shape. There are no laps, seams, or rivets. Clean delivery of the material results from their use.

Their rugged construction and the shape of these Caldwell Seamless Steel Buckets, make them superior to buckets of the standard round bottom type.

Improvements in manufacturing processes have enabled us to press these buckets into the shape of the well-known standard Malleable Iron Style "A" Buckets, the general design of which has proved superior to all other types of buckets heretofore used.

Specify these buckets, use them on your next installation, and you will find our claims are more than justified.

Our large stocks assure prompt shipment.

Catalog and full particulars on request.

The Caldwell Line Includes—

Power Transmission Machinery—Bearings, Shafting, Pulleys, Machine Molded Gears, Cut Gears, Rope Drives, Chains and Wheels. Elevating and Conveying Machinery—Helicoid Conveyor and Accessories, Belt Conveyors, Chain Conveyors, Elevator Buckets, Boots and Casings, Etc. Catalog sent on request.

H. W. CALDWELL & SON CO. (LINK-BELT COMPANY, OWNER) C-10

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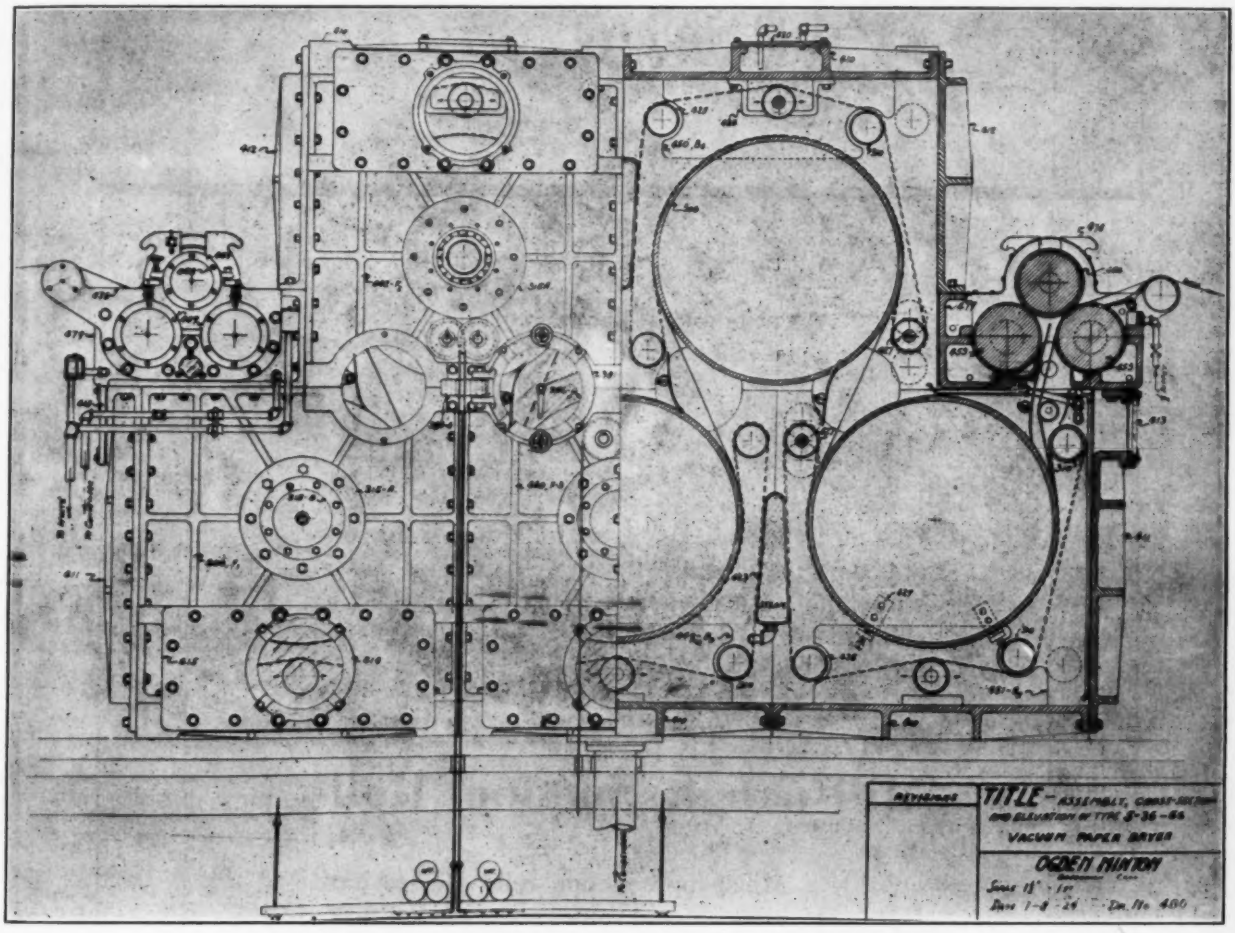
CALDWELL

Conveying and Power Transmission Machinery

chine as a single unit, exposing the entire inside of the seal and allowing it to be inspected and cleaned, and the rubbers changed, if necessary. By simply taking off the caps over the ends of the rolls and loosening the nuts over the ball bearings, the side frames can be taken off and the entire seal dismanteled, making the rolls readily available for regrinding or recovering should there be need of either.

The cast iron chamber is made in unit construction. A study of the cuts will show that each dryer has two side frames, both of which are identical, and one cover plate. If the dryer happens to be a top dryer this cover acts as a top piece, and if it happens to be a bottom dryer this cover acts as a foundation plate. By unbolting one front section, a dryer may be slid out the front of the machine for repairs with little more effort than in the present type of machine. Any felt roll can be removed by unbolting the false frame in front and back and sliding the roll out through the opening so formed, an operation quite as easily performed as in the present type of dryer unit. The sections of the chamber are made of cast iron, suitably ribbed for strength and stiffness, and have surfaces planed where they bolt together. These sections can all be stacked in a planer and a whole group planed at one setting of the planer. To complete them it is merely necessary to drill the holes for the bolts that fasten the sections together. The surfaces are covered with a coating of thick white lead before bolting together, which has been found to make an air tight joint. When the dryer is assembled, a low vacuum is produced on the inside, and the whole machine painted with a special heavy quick drying paint. This paint is forced by atmospheric pressure into any sand holes or imperfections in the castings and dries in the holes as well as in any imperfection of the joints. It has been found a simple matter to get the cast iron chamber air tight by this method.

The illustration of the assembled dryer bearing and stuffing box shows the method of bolting the bearing housing to the side frames. By means of two small jack screws on the front and rear frames, the dryer roll may be set absolutely on the correct centers. The ball bearings and housing assembled is then placed and bolted, after which two special dowel pins, with nuts on their ends to facilitate removal, are put in holes drilled through the bearings housing and the front or rear frames as the case may be. These dowel pins insure that the bearing, if taken out after the original assembling, will necessarily go back in exactly the same place and the dryer roll will be on its correct center line. This is important not only so that the paper will draw well through the machine, but so that the driving gears will always run on correct centers and the teeth mesh on their true pitch circles, thereby making for long life and quiet running gears with little back lash. All of the main castings are doweled with tapered steel dowel pins to insure that after the machine is received from the shop where built, it will be assembled correctly. The doweling, of course, makes for accuracy of set up as equally well if the machine has to be taken down for any reason after its original installation. Drawing No. 488 of the stuffing box shows an oil pipe leading to an H section bronze ring placed between the different groups of packing. This not only lubricates the stuffing box, adds life to the packing, and cuts down the loss due to friction, but it also insures that there will be no air leaks. The oil pressure is slightly greater than atmospheric pressure because of the head of oil from the tank to the bearing, which is sufficient to cause oil to force back the atmosphere, and leak outwardly as well as inwardly. The oil that leaks inwardly lubricates the ball bearing, and when it reaches a certain height it flows off through the overflow pipe to a small pump, which pumps it back to the original tank. There is a check valve in this line to prevent air leaking back. The quantity that leaks outwardly has been found to be very small. It can be run to a small pump and pumped back, if desired, or it can be collected in a drip pan, which has been found en-


REVISIONS
TITLE - ASSEMBLY, CROSS-SECTION AND ELEVATION OF TYPE S-36-66 VACUUM PAPER DRYER
OGDEN MINTON
Scale 1" - 1"
Date 1-8-24
Dr. No. 460

Vacuum Paper Machine Dryer, Assembly Cross-section and Elevation

Announcement

Attention of the Paper Industry is
directed to our new line of

Cycloidal Vacuum Pumps

Designed and built for paper mill work. Important new features. All parts coming in contact with liquid are made from special acid-resisting chilled iron. The use of bronze pumps no longer ncessary except for very special conditions. All parts interchangeable.

Millspaugh Suction Rolls

Over 1000 Millspaugh Suction rolls sold to date. One company ordered nine rolls in February. Twenty-five rolls on order in our shop March 1st.

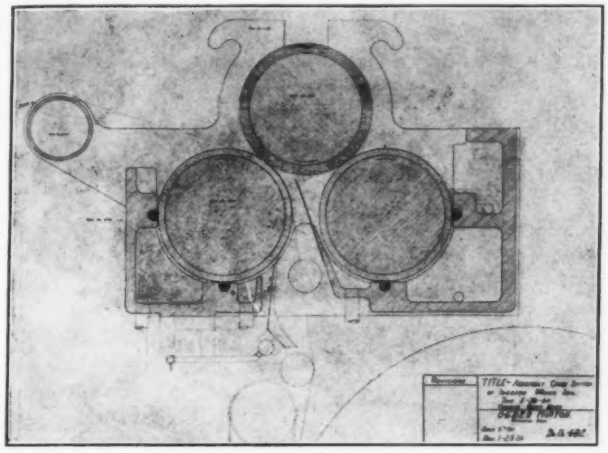
THE SANDUSKY FOUNDRY AND MACHINE COMPANY

Member of Copper & Brass Research Association

SANDUSKY, OHIO

tirely satisfactory. This construction insures a total absence of air leak around the stuffing boxes and affords perfect lubrication.

The cut of the ball bearing housing shows the ball bearings being held in place on the rear of the machine so that there is no end play. The bearing on the front of the machine is not so held. This allows the dryer shell to expand and push the front ball bearing back or forward in cooling off and in heating up. This expansion in a very wide machine is considerable and in the very widest machines provision is made for the front bearing to slide very easily in the housing by other means than shown in this cut. The ball bearing races are ground out slightly larger than standard bearings to allow for expansion due to heat. The expansion and contraction of the main cast iron chamber and the seals is almost uniform, as the temperature difference between these parts is never great. With a 28" vacuum this temperature is only 100° F. and therefore no special provision has to be made to take care of expansion. Also, since this temperature is constant all over the machine, no trouble is experienced from joints working and consequent leaks. The rubber gaskets on the ends of the sealing rolls compensate for any expansion or contraction of these members. The expansion and contraction of the felt carrying rolls is taken care of in the same manner as the dryer rolls, but on a smaller scale, as the temperature of these rolls is never very high.



Ingoing Seal—Cross Section

All dryers, felt carrying rolls, and seal rolls, are balanced statically and dynamically so that vibration is eliminated. The cast iron chamber being in box form, and bolted together, makes an ideal mounting for rolls. As the chamber is also heavy, it affords an excellent foundation, with the result that this type of dryer can be run at speeds greatly in excess of any dryer heretofore built, and with less vibration.

As the entire machine is enclosed in the cast iron chamber it is necessary to be certain that the automatic guide roll operates with certainty. Drawing No. 484 shows how this has been accomplished. The automatic guide roll consists of a shell mounted on ball bearings fixed on a stationary shaft. This shaft is pivoted at one end, the other end, which is mounted on a small ball bearing, moves forward and backward, the bearing running on a guide. The guide actuating roll has a stationary shaft on which the shell is mounted and on the front end there is a separate piece, also mounted on ball bearings. This is made to pull the guide roll by means of a small bronze cable, when the felt runs up on this part. A spring pulls the guide roll backward when the actuating roll is not pulling it forward. Because of the ball bearings and this special design, the guide is very sensitive and holds the felt within close limits. Due to the fact that, when the dryer felts are not properly made, they sometimes tend to run off one way, or the other, and get to a point beyond the control of the automatic guide, a hand guide has been included in the design. The design of this is similar to the automatic guide except that the automatic feature is not included.

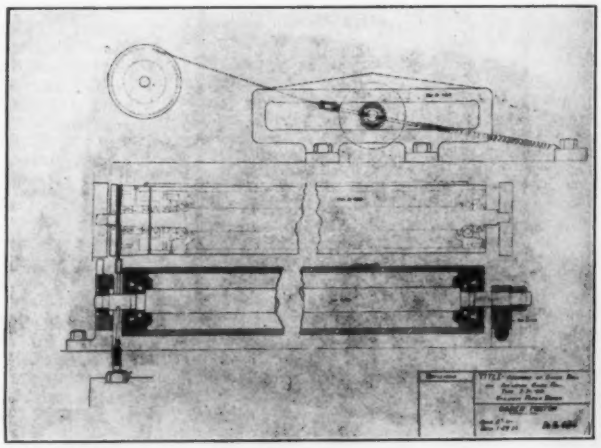
Drawing No. 485 of the automatic stretch roll shows clearly how this operates. The operating shaft is taken out through a stuffing box in the side frame. A steel cable goes down under the floor to which weights are suspended to obtain any desired tension in the felts. There are two of these weight suspension devices, one on each end of the automatic stretch roll. The shaft on which the roll is mounted has a gear on each end which meshes with a rack attached to the inside of the machine, thereby insuring that the stretch roll will move up or down and at the same time remain level and in line at all times, with little or no torsion on the stationary shaft on which the shell is mounted. The hand take-ups for the felts are similar in construction to the automatic, and are of sufficient capacity to take care of all the stretch that may occur in the felt. These hand take-ups have the tension weight on the back side of the machine but on the front side they are designed for manual operation, being made use of only when the automatic take-up has traveled its range and the felt is still too loose.

All of the bearing housings are fitted with Alemite grease gun fittings which makes the filling of bearings with grease a simple, clean operation. This need only be done once or twice a month. The waste of lubricant is reduced to a minimum. All of the bearings and housings have been so designed that it is a simple and quick operation to take out a bearing and insert a new one should occasion demand. Extra bearings may be carried in stock and loss of time from a possible bearing failure should be slight. It has been possible, all through the machine, to use oversize bearings. Their life, therefore, should be extremely long and many times that of the normal size and type of bearing.

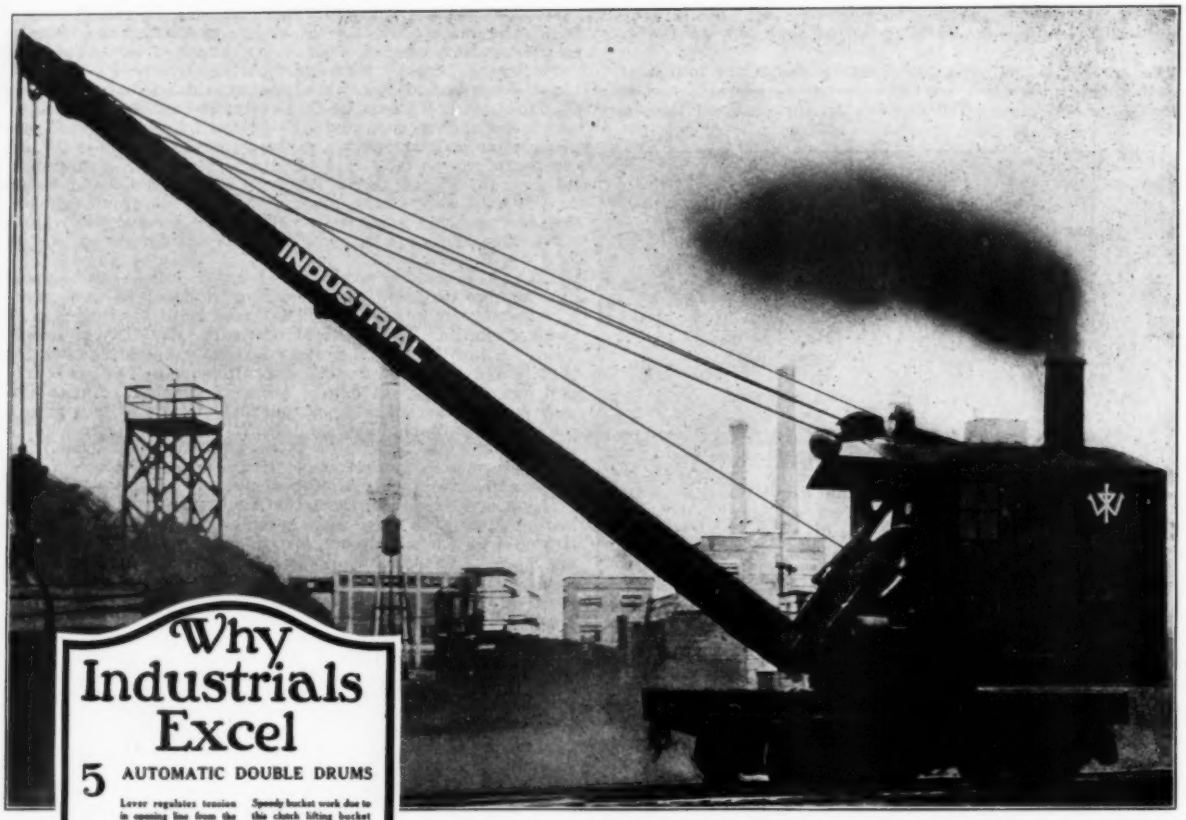
Because of the unit construction of the machine, the following standards have been adopted to facilitate manufacture and to attain better proportions and machine design advantages. For machines up to 80" wide, a 36" diameter dryer is used; for machines from 90" to 160" wide, a 48" diameter dryer is used; and for all machines over 160", a 60" diameter dryer is used. Designs have been made, and stress and strain diagrams, and weight figures, for a machine 240" wide. The total weight of the complete vacuum paper machine dryer is slightly less than that of the present standard type of dryer of the same capacity. Of course, the vacuum paper machine dryer unit has comparatively fewer dryers. The amount of machine work is also slightly less than in the case of the present type of dryer. The cost of erection, and the time required for this work, is about the same as for a present standard dryer section with possibly a slight advantage in favor of the vacuum type. No hood is required nor does the roof of the machine room require special construction, for the vapors are all taken to the condenser. Offsetting these economies, it is necessary to have a condenser and a dry vacuum pump, both of which are standard equipment and require little attention, being placed in the cellar under the machine.

Felt Dryers

Felt dryers of the cell type were installed for a time in the test machine for experimental purposes. Experience has shown that they are unnecessary. Vapor leaving the sheet of paper and passing into the felt remains vapor and passes on through the felt to the vacuum chamber. It can not condense to water, for to do so it must give up its latent heat, which is impossible since the temperature of the surrounding vapor, of the felts, and of this vapor is exactly the same. Unless there is a difference of temperature there can be no exchange of heat units. The only useful function felt dryers could possibly perform would be to warm up the felt and



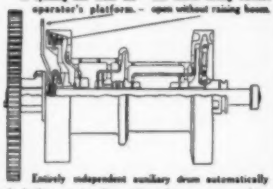
Felt Guide Roll—Longitudinal Section



Why Industrials Excel

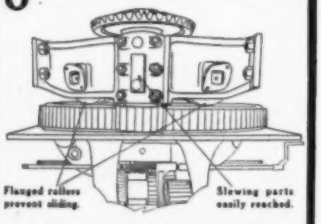
5 AUTOMATIC DOUBLE DRUMS

Lever regulates tension in opening line from the operator's platform. — Speedy bucket work due to this clutch lifting bucket open without raising boom.



Entirely independent auxiliary drum automatically controls bucket opening line without lever or power from other drum and gives two lines for erection or dragline service.

6 POSITIVE SLEWING CONTROL



Flanged rollers prevent sliding. — Slewing parts easily reached.

Extra heavy gearing with external rack bolted rigidly to car body and efficient brake give absolute slewing control, allowing loads to be handled on grades and uneven tracks without danger of sudden rotation with its possible disastrous results.

In print paper making—

AT THE MECHANICSVILLE, N. Y., plant of the West Virginia Pulp & Paper Co., INDUSTRIAL locomotive cranes are used to handle coal, unload sulphur and clay from canal boats to cars and from cars to storage, place heavy machinery, shift cars and perform numerous other material-handling duties. At the Piedmont, W. Va., plant INDUSTRIAL cranes have also been in service for years. High grade printing papers go hand in hand with high-grade locomotive cranes.

INDUSTRIALS are of inestimable value in the paper and pulp industry. Equipped with a clamshell grab bucket, they unload coal, stone, clay and all other bulk materials; with an electro-magnet they handle iron, steel, scrap and all magnetic materials; with a grapple they unload and rehandle pulpwood, stacking it 40 to 50 feet high; with a hook and block they hoist and transfer heavy machinery and all other unit lifts.

There are 17 standard types of INDUSTRIAL cranes with a capacity range from 5 to 200 tons. All are fully illustrated and described in our Golden Anniversary Catalog, a copy of which will be forwarded to you promptly upon request.

INDUSTRIAL WORKS

BAY CITY - MICHIGAN

Locomotive Cranes, 5 to 200 Tons—Transfer, Pillar & Gantry Cranes
Railway Pile Drivers—Combination Crane Pile Drivers—Transfer Tables
Portable Rail Saws—Grab Buckets—Magnets—Steam Pile Hammers

INDUSTRIAL LOCOMOTIVE CRANES

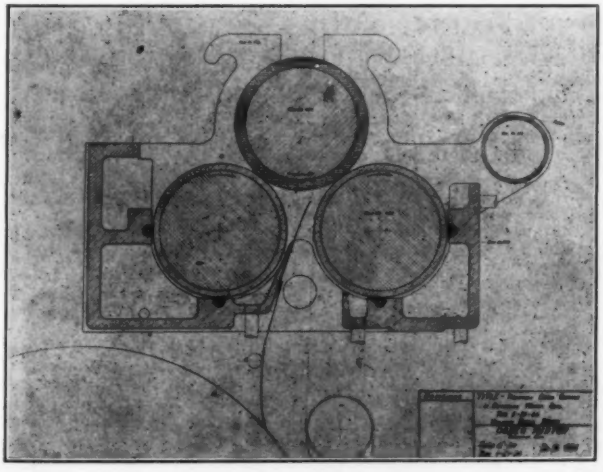
conduct heat units to the paper. But felts are poor conductors of heat and have capacity to absorb little heat from the felt dryers for transmittal to the paper. This is a very different phenomenon than that which occurs in the present standard type of paper machine dryer, where the vapor from the sheet passes into the felt and condenses, causing the felts to run damp, thereby retarding the drying, and making it necessary to equip the machine with felt dryers.

Changing Dryer Felts

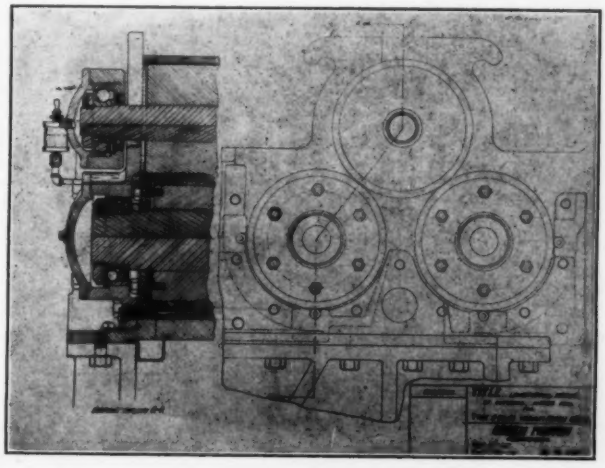
Cross section drawing No. 480 of the type 5-36-66 Vacuum Paper Machine Dryer (5 dryers, 36 inches in diameter, with a 66 inch face) shows individual dryer felts on each dryer. These individual dryer felts were put on this machine so that the dryers could be compensated (run at slightly different speeds) in order that high grade paper might be dried without being stretched. To accomplish this result each succeeding dryer is run at a speed slightly less than the preceding dryer. With this adjustment paper the equivalent of loft-dried paper is produced. When individual felts are used, the endless woolen type is preferred. The felt-carrying rolls are so designed that they may be removed through the front windows. It is not a difficult task to replace a felt, but it seldom has to be done. The life of woolen dryer felts in this type of machine is extremely long, because of the low temperature to which they are exposed, to the slow speed, to the ball bearing rolls which relieve the drag, and to the fact that they never get wet. Cross section drawing No. 491, of the larger dryer section type 15-48-120, shows simply one upper and one lower felt, since this machine, being designed as a Book-Machine, is not compensated. From this latter machine, felt dryers have been eliminated, for reasons explained heretofore. The felts on Type 15-48-120 may be changed in the same manner as in the present type paper machines, except that the door shown at the end of the vacuum type of machine must first be opened. This door may be opened in less than five minutes' time and replaced in another five minutes on even a large machine. In other words there is a delay of only 10 minutes over present methods which delay is but a small proportion of the total time in changing a dryer felt on a wide machine. It should be remembered that, because of the reduced number of dryers, the felt is much shorter—less than half as long—and the loss of 10 minutes mentioned above is more than offset by the time saved in unreeling the new felt and reeling up the old felt. The felts on a vacuum paper machine dryer, however, do not have to be changed so often, as explained above. Thus in the long run there is a large saving in felt changing time instead of a loss as might be supposed.

Passing Paper

When the first Vacuum Paper Machine Dryer was being designed apprehension was felt that passing the paper through the machine might present much difficulty. Accordingly, specially designed, complicated steam doctors were included in the original design. These worked splendidly. But when the machine was first started up, someone neglected to turn the steam into the doctors. Nevertheless, the paper was seent to pass through the machine just as desired. As soon as this was observed the paper was broken down and repassed through the machine. Each time it automatically threaded itself. Needless to say the complicated steam doctors were promptly removed. A study of this situation revealed the fact that, because of the high vacuum, the atmosphere in the vacuum chamber was not sufficient to deflect the paper. Without intending to do so, the old physics experiment of a penny and a feather falling at the same speed in a vacuum tube had been reproduced. Upon leaving one dryer the paper travels straight to the next dryer. It has no tendency to crumple up. Of course, the paper must have sufficient speed to give it momentum to jump the pass. This speed has been found to be about 200 ft. per minute. The faster it travels, the more certain is it to make the pass. A piece of cardboard about nine inches wide and four feet long is passed through with the paper, to help it make the first few passes, since the paper, near the wet end of the dryer, has little body and tends to cling to the dryer shells. The cardboard pieces pass through the machine with the paper, and out through the outgoing seal and may be used over and over again. If cardboard does not happen to be available any dry piece of paper, folded over a few times, answers the purpose just about as well. The cardboard strips, however, serve another purpose in that they fold the end of the paper over and place it in the bite between the rubber and bronze roll of the ingoing seal, and minimize the danger of a machine tender getting his fingers caught in this bite, which has made it possible to place a guard at this point to prevent accidents. After starting the paper into the ingoing seal, the paper threads itself through the machine and out through the outgoing seal, where it is taken and passed through the calender, size tub, or to the reel, as the case may be, in any manner desired. The worst that can happen is for the paper to miss a pass, in which case it falls back and is carried by the felt around the next bottom dryer, skipping the top dryer. In this case the paper is broken down at the entrance and repassed through the machine. Doctors on each dryer prevent the paper from wrapping around a dryer.



Outgoing Seal—Cross Section



Outgoing Seal—Longitudinal Section

Removing Broke

The Vacuum Paper Machine Dryer is fitted with doors, in each of which there is a glass window. These doors can be quickly opened, and are so located that they are directly in front of the pass. A little study of the drawings will show that when these doors are opened a space is provided through which the paper may be speared off in case of failure of a dryer doctor or the snapping off of the paper resulting in its wrapping around a dryer, just as it is now done on standard paper machine. These doors give just about the same size opening as there is between the front frames on a standard paper machine dryer and broke may be removed in the same manner as at present. Paper, however, never breaks on a dryer section till it becomes partly dry. It has much elasticity when wet, so that it will stretch rather than break. But in the Vacuum Paper Machine Dryer, after the paper has become slightly dry it will pass of its own accord. To demonstrate this fact, the author went to a good deal of trouble to make a device to break paper inside the dryer. But because of delicate control all through the machine, a break is a rare occurrence in a Vacuum Paper Machine Dryer.

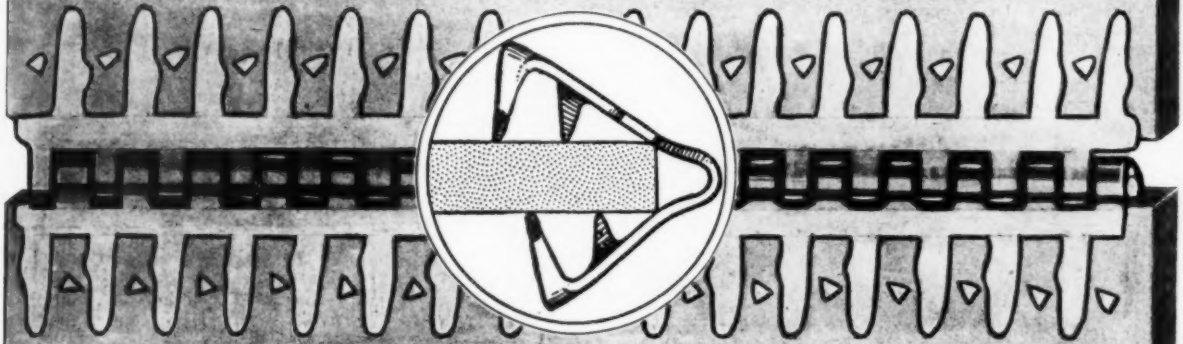
Process of Drying Visible

The inside of the Vacuum Paper Machine Dryer is fitted with electric lights, making the entire inside of the machine

ALLIGATOR

TRADE MARK REG. U. S. PAT. OFFICE

STEEL BELT LACING



Why Some Men's Belting Lasts Longer

The outstanding feature of Alligator Steel Belt Lacing is its method of compressing the belt end. The teeth are clinched down flush with the surface of the belt, each tooth having a vise-like grip. The belt end is protected in a grip of steel. Alligator Steel Belt Lacing is on the "approved" list of leading belting manufacturers. Men who use it learn to expect long, uninterrupted service from their belting.

Sold by leading wholesalers and retailers the world over.

FLEXIBLE STEEL LACING CO.

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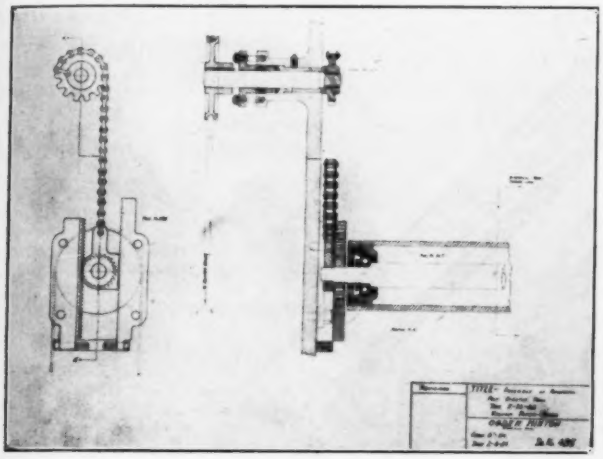
In England at 135 Finsbury Pavement, London, E. C. 2

"Every Tooth A Vise"

For Every Size and Kind of Belt

visible. The several doors with glass windows, allow the process of drying to be watched. The vapor coming off the paper is a true vapor. There is no fog to obstruct the vision and to a stranger to the vacuum process it looks as though there is no drying going on. The paper, when passing through the machine, may be watched. It is an interesting sight to see it, automatically and of its own accord, pass



Automatic Felt Stretch Roll

from dryer to dryer and finally out through the outgoing seal to the atmosphere.

Control of Drying

The boiling point of water at 28" vacuum is 100° F. The temperature of paper on the dryer in the vacuum can never exceed 100° F. until it becomes absolutely dry. For water cannot exist, as water, but must turn to vapor at any temperature above 100° F. at a 28" vacuum. This fact gives a very low drying temperature, which can be varied at will, up or down, depending on the amount of vacuum. When the vacuum is changed, and this may be done quickly, the drying conditions are instantly changed. There is no delay in bringing about the change as in the case of standard paper machine dryers where changed drying conditions are dependent entirely upon raising or lowering the temperature of the dryers, by increasing or decreasing the pressure of the steam within the dryers and then waiting for them to heat up or cool off, as the case may be. Drawing No. 489 shows the automatic vacuum control. In this device there is a glass tube, one end of which is immersed in a small tank of mercury and the other end fits into a special pipe fitting made from an angle valve. One end of the angle valve fitting is connected by a pipe to the vacuum chamber. There is a small steel rod with a needle point on the end going down into the glass tube. The valve stem packing gland packs this against air leaks, but allows the needle to be raised or lowered in the glass tube. As the vacuum increases the mercury rises in the tube until it comes in contact with the needle, which makes an electrical contact through a relay and battery (as shown) and a wire from the battery into the mercury. This relay in turn operates a solenoid controlled valve, allowing air to leak into the vacuum chamber, thus preventing the vacuum from increasing further. The solenoid controlled valve has another valve attached to it, which can be operated by hand in case of failure of the solenoid, and also to regulate the size opening for the air to leak into the vacuum chamber. This device can be made to control the vacuum within .002 inches. By raising or lowering the rod with the needle point in the glass column, any amount of vacuum may be selected and maintained automatically and thereby control the rate of drying as previously explained. This rod may be operated by a device which operates directly from the wetness or dryness of the paper, in which case the control is entirely automatic. This last feature is not shown in the drawing.

Theoretical Considerations

Until very recently the actual phenomenon that takes place in the process of drying paper has not been thoroughly understood. It was at first assumed that the wet paper was always heated to a temperature of 212° F. before the water would boil out of the paper and be absorbed and carried away by the air. In the case of many of the very old machines this was very nearly what took place. However, of the more modern machines this is not true for reasons presently to be explained.

Concerning Evaporating Temperature

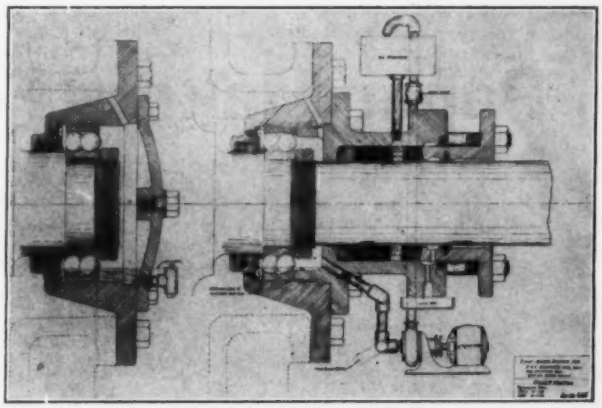
The assumption that the evaporating temperature of water from the paper at atmospheric pressure cannot be over 212° F. is true, because of the fact that 212° F. is the boiling point of water at this pressure. Water cannot exist as water, but will turn to vapor at any temperature over 212° F. at atmospheric pressure. If sufficient heat be applied to water in an open vessel at atmospheric pressure, the temperature of the water will increase until it reaches 212° F., when boiling will take place. The temperature will then remain constant at 212° F. no matter how much additional heat is applied. The rate of evaporation will increase, but not the temperature. It is not true, however, that the evaporating temperature must always be the boiling point (212° F.) for it can be lower. In fact, in paper drying methods as employed today, it is usually lower. The evaporating temperature depends entirely on the vapor pressure.

One of the fundamental laws of thermodynamics covers this point thoroughly and has been stated as follows: **Vaporization from the surface of a liquid above which is the gas of another substance does not take place under the pressure of that gas, but under the pressure of any vapor of the evaporating liquid which may be present and be mixed with the gas.** Thus water in a vessel open at the top will evaporate or vaporize in the same way and with the same absorption of heat and in the same quantity if it be exposed to still air or other similar gas, or be exposed to a space devoid of air or other gas. The pressure under which evaporation takes place is that of the water vapor in the space above the liquid, and if there happens to be air in the space the phenomenon of evaporation is not altered. For very exact physical work this statement must be modified to take account of certain variations introduced by very minute molecular attraction between different gases and vapors, but for the most exact engineering work the law may be stated:

Evaporation from the surface of a liquid in contact with a gas or gases with which the liquid or its vapor does not react chemically is independent of the presence of that gas.

Finding Heat Values

Since the evaporation of the liquid takes place under pressure of that liquid, the latent heat of vaporization and similar quantities must correspond to that pressure. Such heat values can easily be found for any case when a vapor table for that particular substance is at hand, because, although it is generally difficult to measure the vapor pressures, they must correspond to the temperature of the space above the liquid. The vapor in that particular space must be saturated, because if superheated it would lose heat to the liquid as previously described. If saturated, its pressure must cor-



Oiling System for Ball Bearings and Seal for Stuffing Box

respond to its temperature, and knowing the latter the former can be found from the vapor tables. Thus, water with its surface exposed to air at a temperature of t° F. will evaporate until the space above it contains as much water as it is capable of holding at that temperature; that is until the volume occupied by unit weight of the vapor corresponds to the value given in the vapor tables. The water vapor must have the same temperature as the air with which it is mixed, and must have the pressure corresponding to that temperature and also contain all heat in quantities corresponding to

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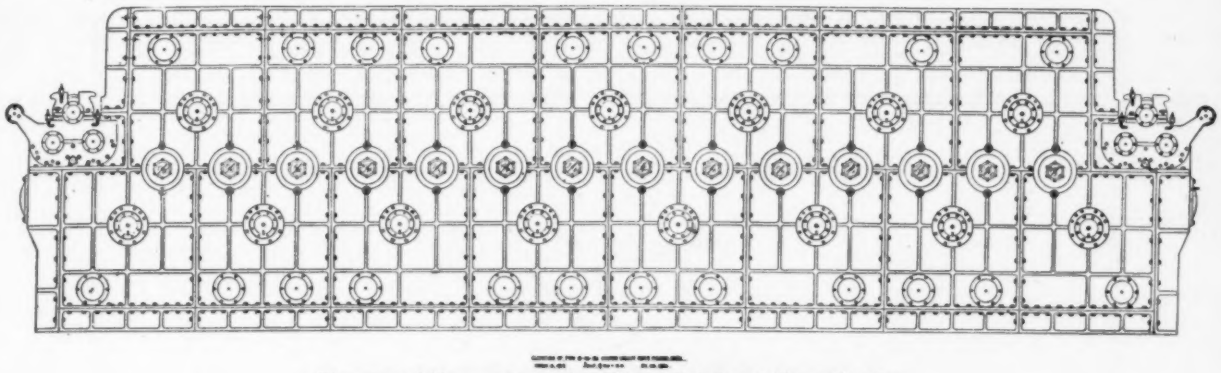


Elevation of Vacuum Dryer for 230-in. High Speed News Machine

that temperature. To find the heat necessary to cause evaporation of one pound under such conditions, the temperature of the space above the liquid must be found in the steam tables. The corresponding heat of vaporization will be the value sought.

The modern type of paper machine (i. e., the machine most commonly used, no attempt being made to include the loft drying process and other similar processes less commonly used) is covered with a hood that fits closely around the drier section and is connected with the roof by a tight-fitting duct. Blowers or exhausters are installed in the system to force large quantities of air, sometimes perheated, through the drier section.

The very old type of paper machine was not equipped with means of passing air through the drier sections. Vapor coming from the paper on the dryer rolls of the old type was very close to 212° F., but in the modern type this temperature is considerably lower. Recent tests of modern paper machines show that this temperature is as low as 175° F., which means evaporation must take place at this or a lower temperature.

The Rate of Drying

In considering the drying of paper, care should be taken not to confuse the RATE of drying with the THERMAL EFFICIENCY. The rate of drying will depend on the difference between the temperature of the steam inside the drier and the EVAPORATING TEMPERATURE of the water in the paper, assuming that the thickness of dryer shells, the material of which they are made as well as their smoothness inside and outside, the oil film, and the quality and tension of felts, are the same in any two cases compared. And the evaporating temperature depends on the rapidity with which the water vapor is taken away when it forms. This water vapor may be taken away by means of air currents as in the modern machine described above, or by drying the paper in a vacuum chamber in which case the vapor goes to the condenser. The results of either method can be made identical. Thus if the evaporating temperature is lowered to 175° F. the rate of drying will correspond to drying under a vacuum of approximately 15.75 inches of mercury.

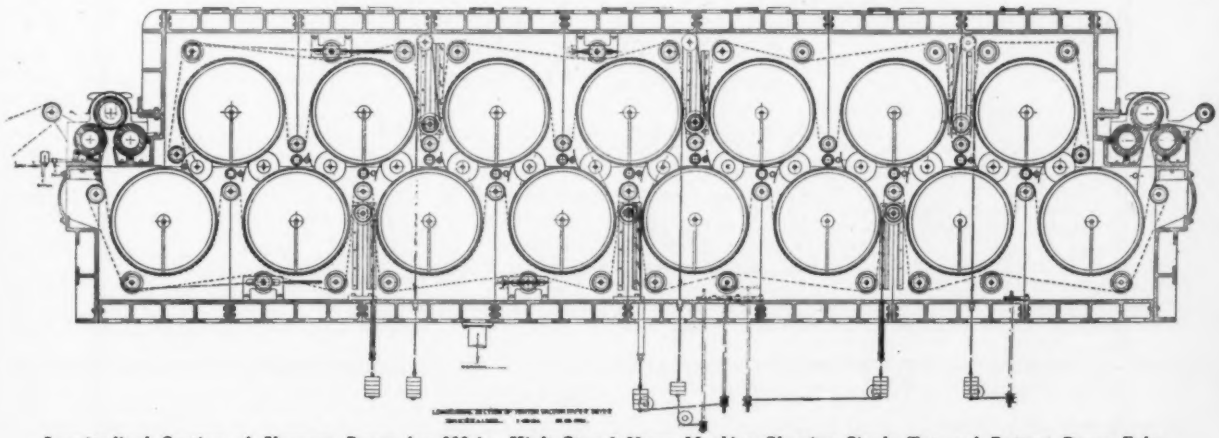
Of course, to lower the evaporating temperature to 175° F. in the modern machine, it is necessary to pass a very large quantity of air through the dryer section to absorb the water vapor. Air is only capable of absorbing a small amount of water vapor before it becomes saturated. In actual practice the air cannot be charged to even nearly 100 per cent saturation or condensation will take place as it leaves the dryer section. This large quantity of air, in passing through the drier section, is heated and discharged through the ventilating system. Thus much heat is wasted in the modern method of drying paper.

Thermal Efficiency

The thermal efficiency of drying under the method using air for the discharge of vapor, falls off in some indefinite ratio to the quantity of air used. Just what this ratio is, cannot be told at the present time with the data now available. Recent tests of paper machines where the rate of drying is rapid show very low thermal efficiencies.

Consider this from another angle. To evaporate a certain amount of moisture a certain number of B. T. Us. must be applied. First the water in the paper must be raised to the temperature of evaporation, and sensible heat to this amount must be added. Then latent heat to change the heated water from water to vapor must be added. (The quantity can readily be calculated from the steam tables when the temperature of evaporation is known.) The quantity of heat that will pass through a dryer shell, all other things being equal, varies directly as the difference between the temperature inside and outside of the dryer. Thus when the temperature of evaporation is lowered a greater temperature difference would be expected, and hence a greater transfer of heat from the steam through the dryer shell with consequent more rapid drying. This is exactly what takes place. At the same time many heat units pass to the air that are only needed to keep it from becoming saturated before it is taken out of the machine room. In other words the method of removing the water vapor by means of air currents is wasteful of heat and the thermal efficiency of this method must be low. As mentioned above recent tests have fully demonstrated this fact.

Because of the delicacy of wet paper and the speed with which it passes through the dryer section, it is extremely



Longitudinal Section of Vacuum Dryer for 230-in. High Speed News Machine Showing Single Top and Bottom Dryer Felts

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difficult to get accurate temperatures of the water vapor leaving the sheet of paper. In fact this temperature varies. While the paper is in contact with the surface of one dryer it is at one temperature and while passing from one dryer to the other its temperature must change at least slightly. Various methods of taking such temperatures have been devised but there is reason to doubt their accuracy. For instance, it is not sufficient to take the temperature of the outside of the dryer shell as the temperature of evaporation. Moreover taking the temperature of the outside of the dryer shell is difficult and even when this temperature is taken by means of thermol-couples there is reason to doubt the accuracy. However, sufficiently accurate readings have been taken to demonstrate the method of drying paper outlined above and actual tests of the whole drying unit confirm this theory very closely.

Seeking Reliable Data

Much data is being collected by skilled engineers who have recently given this subject a great deal of thought and eventually reliable data will be obtained. The difficulties are great, however, and after the data is all at hand it is going to be quite a task to make assumptions from this data as to just what takes place. Such questions as, What happens to the sheet of paper passing from dryer to dryer? will have to be answered. Does water actually evaporate in the pass? If it does evaporate it must get its latent heat from somewhere to do so. Where does it get it? The temperature of the various dryers increases as we approach the dry end. How then shall we get an average figure of evaporation? Many such questions can be asked and in the present state of the art it is quite impossible to answer these questions entirely satisfactorily.

Some difficulty has been encountered in explaining the phenomenon of evaporation at temperatures under 212° F., but the following helps to an understanding. Under a vacuum of 28 inches of mercury for example, the steam tables indicate the temperature of evaporation to be practically 100° F. and the quantity of water in 1 cu. ft. of vapor to be 0.002851 lb. The humidity table indicates that 1 cu. ft. of free air at atmospheric pressure will at 100° F. hold just 0.002851 lb. of water. The two are equal. In other words the vapor pressure (the weight of water vapor per cubic foot) is the same in the vacuum as in the free air, and, as we have previously shown, it is the vapor pressure that controls the drying or evaporation.

There is obviously a limit to which the temperature of evaporation can be lowered by means of absorption of the water vapor by air. Moreover, the lower this temperature is, the less economy will result from the drying operation because of the large quantity of air that absorbs heat as explained above. Again the entering air has to be sufficiently hot and sufficiently dry to be efficient in absorbing moisture. The ideal condition of course would be to have the entering air entirely free of moisture but this of course cannot be had. Also if the temperature of the entering air were above the temperature of evaporation the air would then give heat up to the paper and the drying rate would be still further increased but the economy would again be lessened, since a large quantity of heat would be absorbed in raising the temperature of the air.

Purposely, no attempt has been made to give actual figures in the above discussion. We feel that such figures in the present state of the art are not available with anywhere near the degree of accuracy necessary for mathematical calculations. It is felt that the drying of paper is a much more complicated process than heretofore considered and that much work is still to be done before accurate data will be available. Moreover, weather conditions that vary from day to day have a marked influence on the rate of drying and affect thermal efficiency. No two days are exactly alike.

Vacuum Paper Machine Dryer

Drying paper in a vacuum is a simpler process than drying as practiced today, in consequence of which much more accurate data can be obtained. In a vacuum, the temperature of evaporation must be the temperature corresponding to the vapor pressure which is the amount of vacuum. Theoretically we have a saturated vapor surrounding the paper at the temperature and the pressure of the vacuum being used. Knowing the vacuum the temperature can be found from the steam tables. If the vacuum is 28 in. of mercury, the temperature of evaporation will be approximately 100° F. and the RATE of evaporation will be directly proportional to the difference between the temperature of the steam in the dryer and the temperature of evaporation, all other factors being considered equal, such as condition and tension of dryer felt, thickness of dryer shell, oil or grease film on inside of dryer, and surface of outside and inside of dryer shell.

As to Vacuum Drying

In vacuum drying, the RATE of drying and the thermal efficiency are absolutely independent of weather conditions since the paper is not dried in the presence of air but in a vacuum and at a temperature which is maintained constant regardless of the outside temperature or humidity. Winter or summer, and dampness or dryness of weather, are not factors in vacuum drying. As the wet paper enters the vacuum paper machine dryer it comes in contact with a heated

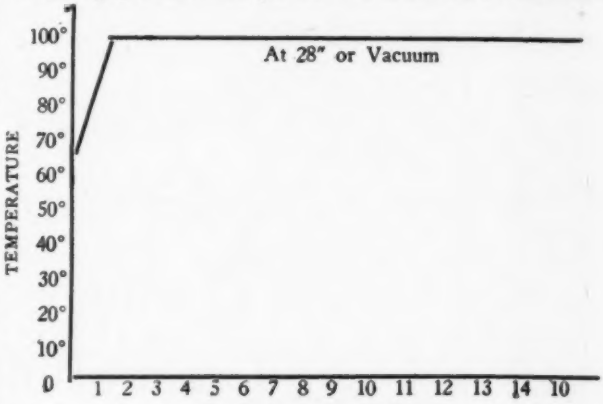

Fig. 1.—Number of Dryers

dryer and sensible heat is passed to the water in the paper thus raising its temperature to the evaporating temperature corresponding to the amount of vacuum being carried. The amount of sensible heat is small and in most cases the paper will reach the evaporating temperature before leaving the first or second dryer. From this point on, the RATE of evaporation will be constant on all dryers. The paper in making the pass from one dryer to the next will neither take on nor give off heat units, because the temperature of the vapor surrounding the paper in the pass will be the same as the temperature of evaporation. (The curve is shown in Fig. 1.)

With the vacuum machine it is possible to very precisely regulate the rate and amount of drying because not only the steam pressure within the dryer, but the amount of vacuum, can readily be changed. By increasing or decreasing the amount of vacuum the drying conditions are instantly changed and no delay is encountered in waiting for the dryer shells to cool off or heat up as is the case in the present type of paper machine dryers. By means of a simple but effective device, the amount of vacuum can be automatically regulated to within 2/1000 of an inch. It is feasible to connect this control with another device whereby the moisture content of the paper leaving the dryer will regulate the vacuum. Thus the papermaker may be relieved forever of the uncertainty of how wet or how dry his paper is going into the reel, absolute uniformity of moisture being assured. This makes for a considerable saving as the news papermaker can leave just 10 per cent of moisture in his paper and get paid for it. As it is now the papermaker dries his paper something below 10 per cent as a margin of safety because of the fact that he cannot control his moisture per cent very close since his drying is dependent upon weather conditions and since his control of drying temperature is limited to his control of the steam pressure which control has a very considerable lag.

Thermal Efficiency High

The thermal efficiency of vacuum drying must necessarily be high, almost 100 per cent. The dryers being enclosed in a high vacuum (which acts similar to a thermos bottle) only give up heat to the paper which is in contact with them —no air is present to absorb and carry away heat units. If for instance a vacuum of 28 inches of mercury is carried the drying temperature or temperature of evaporation will be about 100° F. and the vapor given off will be at this same temperature. The vacuum case will therefore be at this temperature. If, as occasionally happens on a hot day in summer, the temperature of the air in the machine room should be over 100° F. the vacuum dryer case would actually take a small amount of heat from the atmosphere of the room and the machine would be apparently over 100 per cent efficient.

The only heat loss in the operation of a vacuum paper machine dryer will be the radiation of heat from the cast iron

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case in which the dryers are enclosed. The temperature of this case (when a 28" vacuum is carried) will not be over 100° F. and with a machine room temperature of 75° F. the slight difference of 25° F. in temperature will cause little loss of heat. This loss may be further minimized by the application of a coating of 85 per cent magnesia insulation over the case of the machine.

Again, when using a vacuum of 28 in. the water going to the hot well of the condenser will be at approximately 90° F. and this warm water is available for use in the beaters or in the flow box of the paper machine instead of ice cold water which some of the northern mills have to use in winter. Practically all the heat units expended in the process of drying are thus brought back in this warm water. If this warm water all be use, the cost of heat for drying can be called zero.

A plan has been worked out whereby the white water from the machine or the save-all is used for condensing water which, in condensing the vapors from the paper machine dryer, is heated up and then returned to the beaters or the paper machine, or elsewhere as needed, thus returning all of the heat expended in drying the paper.

Making Calculations

Considerable emphasis above has been put upon the fact that the RATE of drying depends on the difference between the temperature of the steam inside the dryer and the evaporating temperature of the water in the paper. In calculating the size and number of dryer rolls this fact is important. If, in designing a new paper machine, the moisture content of the paper and the RATE of evaporation of the moisture be known, the number and size of dryers necessary can very readily be calculated. Also the theoretical number of heat units necessary to complete the drying process can be determined. In theory these figures, applicable to the vacuum process, can be arrived at with a good deal of accuracy but allowance must be made for such factors as the smoothness of the dryer surface, quality, thickness and tension of felts, thickness and material of dryer shells, and surface of inside and outside of dryer. These factors, however, are the same as are met with in atmospheric drying. Table No. 1 gives an approximate idea of the extent to which the rate of drying determines the size of the drying units necessary. In this table, for sake of comparison, a steam pressure of 5.3 lbs. gage pressure inside of the dryer has been assumed for all cases, 5.3 lbs. being an average steam pressure used in actual practice today. In varying this pressure it is interesting to note the effect upon the rate of drying.

This shows the extent of control a papermaker has over his rate of drying with the present standard paper machines. It is also interesting to change the figures given in this table on line No. 2 and calculate the additional control of drying that can be had with a vacuum paper machine dryer. These figures can be found in the steam table opposite any amount of vacuum that may be carried in the vacuum chamber; and it should be remembered that with the vacuum paper machine dryer the papermaker can select any vacuum within reasonable limits and have it automatically maintained constant for him as previously described.

Heat Units Decrease

Another significant fact to be noted from table No. 1 is that the total number of heat units (line No. 7) to dry the paper decreases as the temperature of evaporation (line No. 2) is reduced. True this is not any very great amount, but nevertheless it is a real saving of heat units and thus of coal. Because of the negligible heat losses in the vacuum paper machine dryer the total heat units shown in line No. 7, table No. 1, very nearly represent the total heat required to evaporate 1 lb. of water under any given condition of vacuum. As previously explained, this is not true in the present day paper machine because in order to lower the temperature of evaporation the papermaker must pass a very large quantity of air through the bank of dryers. This air absorbs heat units and the heat units so absorbed represent the loss in thermal efficiency. By accelerating the rate of drying through the introduction of additional quantities of air to lower the temperature of evaporation, a direct falling off in thermal efficiency results. This is unfortunate, because, except for this one fact, there is a decided advantage to be gained by reducing this evaporating temperature.

It is conceded by almost all modern paper makers that a low drying temperature improves the quality of the paper in strength, degree of sizing, brightness of colors or tints and the ability of paper to age without turning a brown faded color when exposed to light for any long period of time. When paper is dried in a vacuum paper machine dryer under a vacuum of 28 in. of mercury the paper can never reach a temperature over 100° F., which temperature is no greater than the temperature of some of the hot days of summer. The fibers of paper dried at this temperature are not scorched or burned. The low drying temperature will not turn the size in the paper to starch or fade delicate colors or tints. It is impossible with the data now available to say just how much stronger or better paper will be when dried at this low temperature but in some cases the added strength and quality undoubtedly will be considerable. This is particularly true of paper made of the cheaper grades of stock such as ground wood. Thus the papermaker can use cheaper stock and make the same or a better quality of paper.

Number of Dryers Required

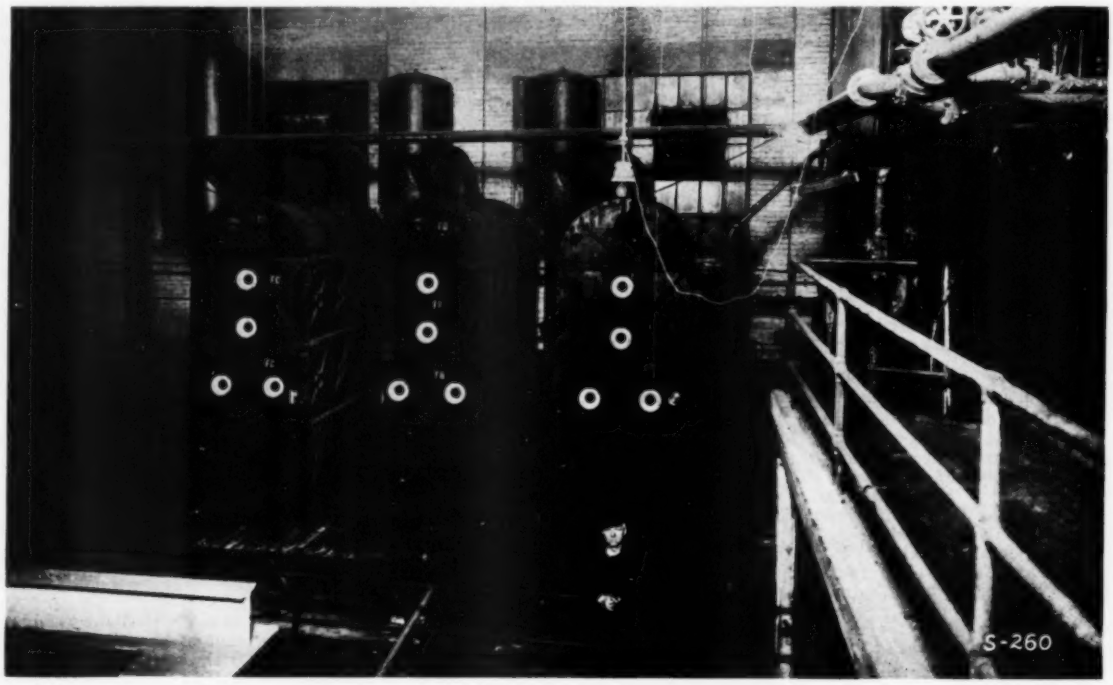
The number and size of dryers necessary to a drying machine in part depends upon the percentage of water to be evaporated from the paper. In referring to this percentage, 70 per cent wet shall be taken to mean that the web contains 70 per cent water and 30 per cent of bone dry stock. Table No. 2 has been prepared to show the quantity of water necessary to be evaporated to produce one pound of paper both bone dry and 8 per cent wet. (Some papermakers work upon a bone dry stock basis and some upon an 8 per cent wet stock basis.) Incidentally, it may be pointed out that this table shows the importance of having the wet presses perform properly. There is a certain percentage of wetness of stock that is most economical, considering cost of press felts against cost of steam, but this is a percentage that each

Table No. 2

Wet water %	Bone dry stock %	Water evaporated per lb. bone dry paper Lb.	Water evaporated per lb. 8% wet stock Lb.
75	25	3	2.68
74	26	2.85	2.55
73	27	2.70	2.404
72	28	2.57	2.294
71	29	2.45	2.174
70	30	2.33	2.07
69	31	2.23	1.972
68	32	2.12	1.871
67	33	2.03	1.788
66	34	1.94	1.7
65	35	1.86	1.625
64	36	1.78	1.556
63	37	1.70	1.484
62	38	1.63	1.422
61	39	1.56	1.36
60	40	1.50	1.30

TABLE NO. 1

No.		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	Steam pressure in drier (lb. per sq. in. gage)	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3	5.3
1.	Steam temp. in drier (° F.)	228	228	228	228	228	228	228	228	228	228	228	228	228	228	228
2.	Temp. of evaporation of water in paper (° F.)	212	201.96	193.22	182.86	176.85	170.06	162.28	153.01	141.52	126.15	101.83	100	90	80	70
3.	Difference of temp =1-2 (° F.)	16	26.04	34.78	45.14	51.15	57.94	65.72	74.99	86.48	101.85	126.17	128	138	148	158
4.	Ratio (first difference considered at unit)	Unit	1.63	2.17	2.82	3.19	3.63	4.11	4.66	5.34	6.34	7.89	8	8.61	9.25	9.89
5.	B. t. u. sensible heat to raise 1 lb. water from 65° F. to temp. of evaporation (2-65° F.)	147	136.96	128.22	117.86	111.85	105.06	97.28	88.01	76.52	61.15	36.83	38	25	15	5
6.	B. t. u. latent heat which has to be added to 1 lb. water to change same to vapor	970.4	976.60	982.0	988.2	991.8	995.8	1,000.3	1,005.7	1,012.3	1,021	1,034	1,035.6	1,041.2	1,046.7	1,052.3
7.	Total B. t. u. (=(5)-(6)) necessary for evaporation	1,117.4	1,113.56	1,110.22	1,106.06	1,103.65	1,100.86	1,097.58	1,093.71	1,088.55	1,082.15	1,070.83	1,070.6	1,066.2	1,061.7	1,057.3
8.	Corresponding vacuum (in. of Hg.)	0	5.49	9.56	13.63	15.67	17.70	19.74	21.78	23.81	25.85	27.88	28	28.50	28.89	29.18



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papermaker must determine for his own particular paper machine in the light of cost of felts and cost of steam.

From tests, the papermaker can determine the percentage of wetness of paper stock going to the dryer. This percentage known, the amount of water to be evaporated to produce 8 per cent wet paper can be determined from table No. 2. For illustration let it be assumed that the paper stock is at a temperature of 65° F. and is 69 per cent wet (nearly an average for newsprint). Table No. 2 indicates that 1.972 lbs. of water is to be evaporated for each pound of 8 per cent wet paper to be made under these conditions. Table No. 1, line No. 2, indicates the temperature of evaporation and line No. 7 the total number of B. t. u.'s necessary to evaporate 1 lb. of water. This latter figure multiplied by the number of pounds of water gives the total B. t. u.'s necessary to produce 1 lb. of paper. Assuming the paper to be dried in a vacuum paper machine, the calculation is as follows:

Temperature of wet stock .....65°
Vacuum .....28 in. Hg.
Temperature of evaporation .....100° F.
Total B. t. u.'s necessary to evaporate 1 lb. of water....1070.6

Then from table No. 2:

Wetness .....69 per cent
Water to be evaporated .....1.976 lbs.

Then 1070.6 × = 2,116.50 B. t. u.'s necessary to produce 1 lb. of 8 per cent wet paper.

The negligible amount of sensible heat necessary to raise the actual paper stock from 65° F. to 100° F. has been purposely disregarded.

Each pound of steam at 5.3 lbs. pressure contains 960.0 B. t. u.'s of latent heat which is given up to drying paper.

Then $\frac{2116.50}{960.0}$ = 2.203 lbs. of steam at 5.3 lbs. which is necessary to produce 1 lb. of 8 per cent wet paper with 100 per cent thermal efficiency.

Some Mill Data

A vacuum paper machine dryer will very nearly attain the results indicated by these calculations. One of the best known, best managed, and most modern news print mills in Canada is understood to use 3.25 lbs. of steam per pound of paper. Its steam costs $0.65 per 1,000 lbs. The mill in question makes 100,000 tons of newspaper per year. This data affords the basis for an interesting calculation:

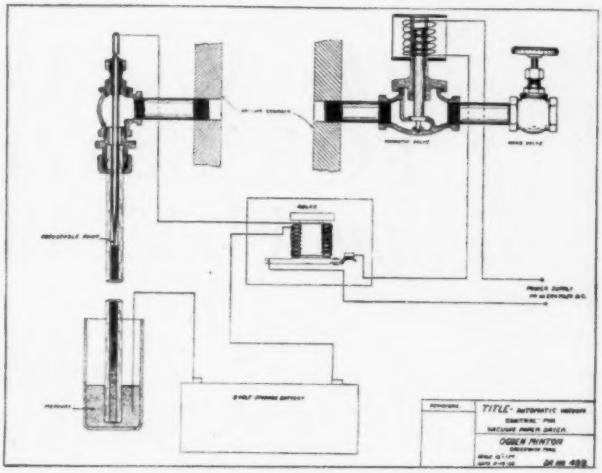
Steam used per lb. of paper.....3.25 lb.
If dried in a vacuum paper machine dryer,
Steam used per lb. of paper.....2.203 lb. theoretical
Say, 2.25 lb. actual.
Saving of steam per lb. of paper.....1.00 lb.
100,000×2,000 lb. steam=200,000,000 lb. of steam.

$\frac{200,000,000}{1,000}$ × $0.65=$130,000 per year saving in steam alone.

The vacuum paper machine dryer has other great advantages. Being entirely enclosed none of the moisture from the drying process is set free in the machine room but is conducted by a pipe to a condenser and condensed. This obviates the necessity for an expensive ventilating system. The machine room, even in summer, need not be hot and the air may be normal in moisture. As a result, present day working conditions can be greatly improved. Also from a study of "ratios" Table 1, line 4, it will be seen that a vacuum paper machine dryer operating under 28-in. vacuum (column 12) required only one-eighth the number of dryers required by a standard paper machine as indicated in column 1. Ratio of number of dryers can be figured for any other cases desired. We have yet to find a case where the same amount of paper could not be dried on one-half the number of dryers now being used. This means that the dryer section of the paper machine will be never over one-half its present length and in some cases much shorter and have the same drying capacity. This will save a great amount of floor space and in cases where the production of paper is limited by drying capacity, as is often the case, will allow of materially increased paper production without enlarging mill space. Also, the reduction in number of dryers means that the distance from the wet end to the dry end will be greatly reduced, making it easier for the machine tenders to operate the machine.

Some paper makers claim that the engine driving the paper machine provides sufficient exhaust steam for drying their paper and it is unnecessary to use live steam for drying. This may be true, but with the vacuum dryer they can install a more economical engine, of less power and yielding less exhaust steam, with very substantial savings.

Condensing the vapors from the vacuum paper machine dryer present no new or difficult problems. The equipment is identical with that used for condensing exhaust steam from any engine or turbine, and this is standard. Most paper mills have an abundant supply of water and, when this is true, an eductor type of condenser can be used, through which it is merely necessary to pass cold water. This type of condenser can be made to eject a considerable amount of air, sufficient in most cases to offset any leaks in the dryer and piping, without necessitating a dry vacuum pump. The type of condenser most suitable will depend on local conditions such as the availability of water, the head for inlet water, and the level at which the hot-well can con-



Automatic Control for Vacuum

veniently be placed. The cost of condensers is small, they are simple construction, and they require little attention to keep them running successfully. Contrary to the general opinion, a full vacuum (28 in. mercury) can be quickly obtained. The present Minton Vacuum Dryer consistently obtains this vacuum in less than three minutes. This time interval will be entirely dependent on the type and size of condenser and vacuum pump installed.

Any type of device for removal of water from dryers such as buckets, siphons, etc., as well as any system of traps for drips and any system of steam inlet to dryers, may be used exactly as on present machines. Existing dryers can be used and as a rule only slight alterations are necessary to adopt them for use in vacuum paper machine dryers.

Practical Considerations

It is an interesting calculation to show the amount of water vapor that has to be absorbed and carried away by means of air from a machine room equipped with two large high speed news machines. Assume a case, and there are such, of a machine room with two machines capable of making 100 tons of paper on each machine every 24 hours. Assume also that the paper going to the dryers of these machines is 70% wet, which is a fair figure. Then for every pound of paper made there is (from table No. 2) 2.07 lbs. of water evaporated.

100 tons × 2,000 lbs. × 2.07 = 414,000 lbs. of water evaporated per 24 hours and for the two machines there would be 828,000 lbs. of water evaporated per 24 hours. It is no wonder that an elaborate ventilating system is necessary to take care of this amount of moisture, and it is not surprising that heat losses are so great, when considered from this standpoint. The Vacuum Paper Machine Dryer will evaporate this moisture at almost 100% thermal efficiency and then return practically all of the heat used for evaporation, in the form of water at 90° F. for use in the beaters and flowbox, which in the winter time in a northern mill is an important item.

Savings

In estimating the saving in steam that will be brought about by changing from a standard dryer section to a vacuum paper machine dryer, each individual case has to be considered on its own merits. Some dryer sections are much more efficient than others. In some cases the cost of steam is much less than in others. The per cent of saving of steam per pound of paper made is of course more attractive to the mill making the cheaper grades of paper. For if the vacuum paper machine dryer saves a certain amount of money per ton and the price per ton is low, the saving is relatively large, whereas if the price per ton be high the saving in steam would

Nash Hytor

The VACUUM PUMP FOR SUCTION ROLL *and* FLAT BOX SERVICE

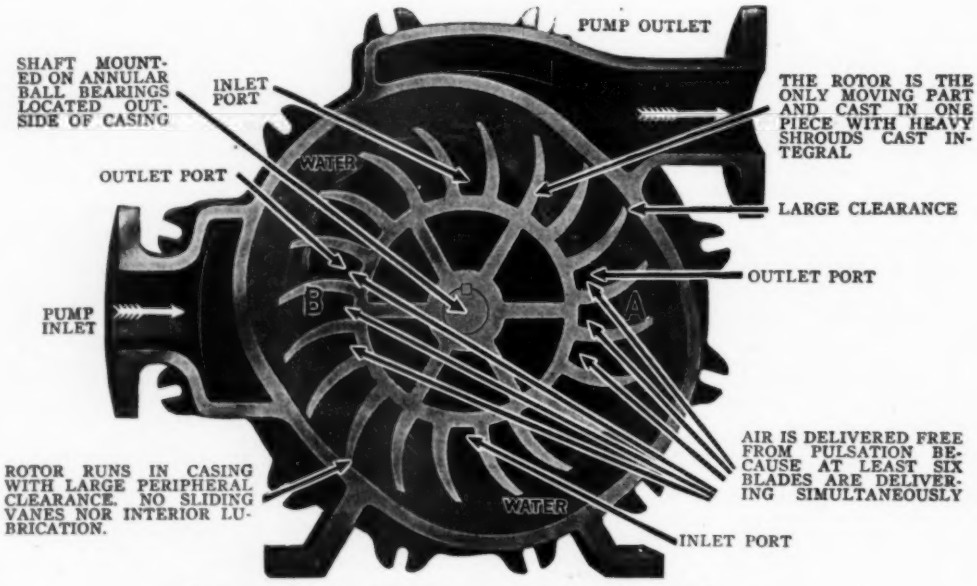

PUMP OUTLET
SHAFT MOUNTED ON ANNULAR BALL BEARINGS LOCATED OUTSIDE OF CASING
INLET PORT
THE ROTOR IS THE ONLY MOVING PART AND CAST IN ONE PIECE WITH HEAVY SHROUDS CAST INTEGRAL
WATER
OUTLET PORT
LARGE CLEARANCE
OUTLET PORT
PUMP INLET
B
A
AIR IS DELIVERED FREE FROM PULSATION BECAUSE AT LEAST SIX BLADES ARE DELIVERING SIMULTANEOUSLY
ROTOR RUNS IN CASING WITH LARGE PERIPHERAL CLEARANCE. NO SLIDING VANES NOR INTERIOR LUBRICATION.
WATER
INLET PORT

Diagram illustrating unique principle of operation

Vacuum Produced Absolutely Without Pulsation. No Vibration. Saves Wires. Only One Moving Part. No Rods, Pistons, Crank Shafts, Loose Moving Parts and No Gears. No Expert Attendance.

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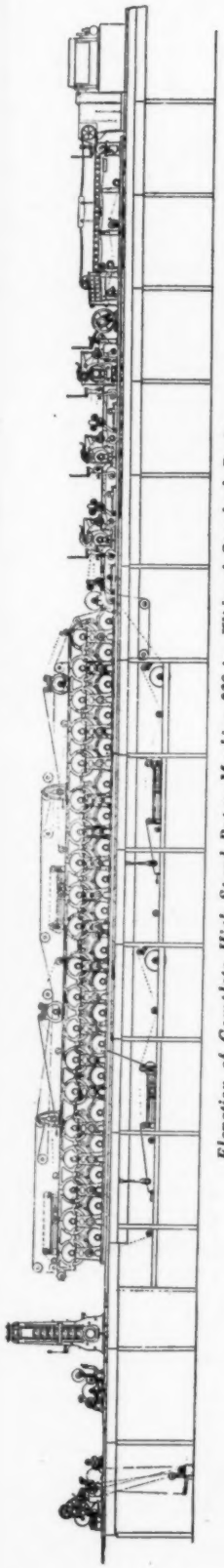
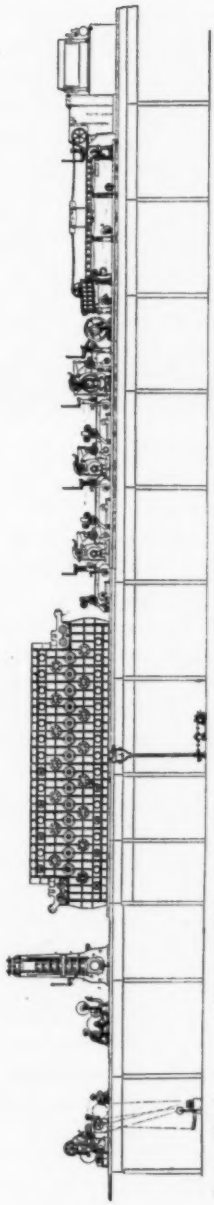
Western Representative
T. H. SAVERY, JR.
1718 Republic Bldg.,
Chicago, Ill.

New England Representative
G. H. GLEASON
185 Devonshire St.,
Boston, Mass.



Elevation of Complete High Speed Paper Machine 230-in. Wide of Standard Design



Same Machine as Above with Vacuum Dryer. Drawn on Same Scale to Show Difference in Floor Space and Building Required

appear of relatively less importance. On any low priced paper such as news, board of various kinds, or pulp, the saving in steam alone can be shown to make it profitable for the paper maker to replace his present dryer with a vacuum paper machine dryer. Take for example a news machine making 100 tons of paper per day. We have:

100 tons per day × 300 days = 30,000 tons per year.

30,000 tons × 2,000 lbs. = 60,000,000 lbs. of paper per year. We have shown previously that the saving is 1 lb. of steam per pound of paper made, and when an average is taken the year around, including winter weather, this figure is very conservative. If steam costs 60c per 1,000 lbs., which is an average figure for northern mills, we have:

$$\frac{60{,}000{,}000}{1{,}000} \times .60 = \$36{,}000.00$$

saving per year in cost of steam. This is the interest at 6% on $600,000,000. An estimate of the cost of a Vacuum Paper Machine Dryer for a machine of this type would be under $100,000.00, showing a considerable saving. Add to this the saving due to the fact that all of the heat units used in drying the paper are returned in the water at 90° in the hot-well for use in the beaters and the flowbox, which in winter are needed and must be supplied, and the saving in steam per pound of paper would be more nearly 3 lbs. than 1 lb. On a year round average it can be shown that the saving in steam would average close to 2.5 lbs., making the saving figure $90,000.00 instead of $36,000.00 as shown. In this case the vacuum paper machine dryer would pay for itself in one year. To the above savings there must be added the savings in cost of felts, lubrication, floor space occupied, and the improved quality of paper. This last item will be considerable. More ground wood may be used in the furnish and less sulphite pulp and the same strength paper made. Still there is to be taken account of savings due to lowered power and surely the improved working conditions are an item of considerable value, as in some instances the vacuum paper machine may be operated with fewer men.

The above facts show beyond doubt that the paper maker will profit considerably by replacing his present drying equipment with a vacuum paper machine dryer.

It should be noted here that when the vacuum paper machine dryer is installed in a mill, the heating of the machine room in winter is no different from heating any other room. In many of the tests of paper machine dryers that have been carefully studied it has been noted that the steam used to heat the machine room had not been charged against drying the paper. It should be. The results of these tests as far as thermal efficiency go would show a considerably lower efficiency were this taken into account.

In the case of the paper maker making medium priced papers, similar savings and economies can be shown but the improved quality of paper he can make with a vacuum paper machine dryer is of even greater consideration. By using a cheaper furnish he can produce paper of equal quality and even larger savings realized.

In the case of the papermaker making the very high grade papers, especially loft dried papers, reduced costs are tremendous. By taking paper direct from the wet press and drying it in a compensated vacuum paper machine dryer at 28″ vacuum and a temperature of 100° F., then tub sizing the paper and redrying in a second vacuum paper machine dryer, paper the equivalent of loft dried paper, including the cockle (if desired) can be made in reels and the high cost of loft drying and sheet calendering avoided. Remember that this paper is dried originally and also the second time at a temperature of 100° F., which is lower than the loft drying temperature, and the paper is dried without being stretched.

Calculations will show that a Yankee Dryer of comparatively small diameter will have a tremendous drying capacity and therefore high speed and also high thermal efficiency.

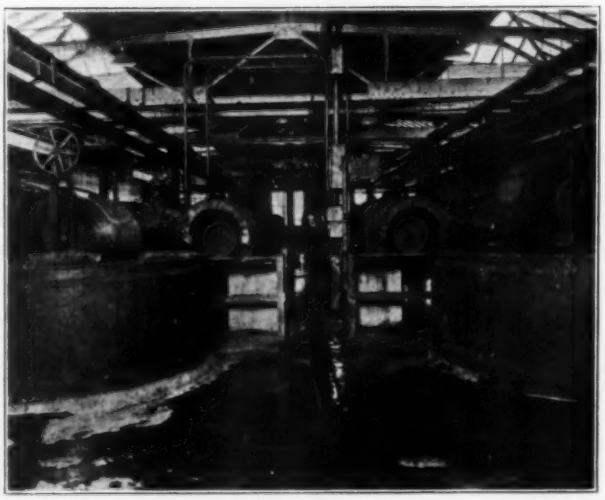
The savings in cost of dryer felts is an appreciable item. As explained before, the felts are less than half the usual length, temperature to which they are subject is low, and as there is very little drag on them because of the fact that the felt carrying rolls are all mounted on ball bearings. As a result they have long life.

Working Conditions

In the opinion of the author one of the best features of the Vacuum Paper Machine Dryer is that the machine room will be free from the moisture and heat and the machine so shortened that working conditions will be very greatly improved. The distance from the last wet press to the calender or reel will seem ridiculously short. Drawing No. 492 shows the comparison of a 230″ News Machine, with standard dryers, and with a Vacuum Paper Machine Dryer. This particular machine has a comparatively low temperature of evaporation and the vacuum paper machine dryer is longer and contains

(*Continued on page* 237)

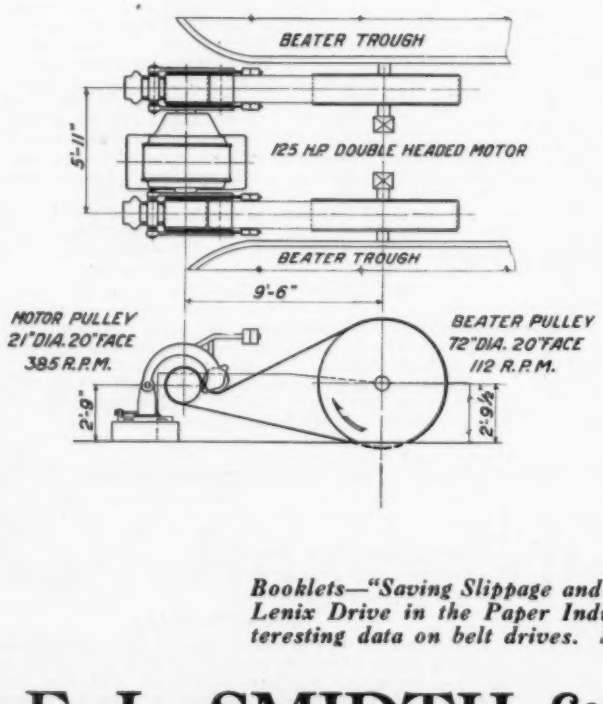
The Lenix* Belt Drive



There are **fourteen** Lenix Drives installed in the Beater Room illustrated. They are operating in connection with seven 100 H.P. double headed motors driving fourteen beaters, and each pair is laid out substantially as shown in the linecut.

The belt drive gives the elasticity necessary for the success of Beater Drives. A double headed motor of a size only slightly larger than the combined running load of the two beaters is ample to handle the high starting torque of each beater. With individual motor drive an oversized motor would be necessary.

The Lenixes are the flexible links between the motor and the two beaters. No two belts will stretch the same. In the ordinary open drive with double headed motor this stretch cannot be taken up by shifting the motor without producing unequal tension in the two belts. Overnight changes in atmospheric or temperature conditions will affect the tension in the belts and in the ordinary open drive satisfactory adjustment is not possible. With the Lenix Drive, the uneven stretch of the belts is taken up by the Lenix and used to increase the arc of contact on the motor pulley, and just sufficient tension is maintained in the slack side of the belt to transmit the load without slippage regardless of the atmospheric or temperature conditions.



The Lenix compensates for adjustment or movement of the beater shaft whether this is done by regulation or caused by impurities in the stock treated.

The short centers not only possible but preferable with the Lenix **save floor space** and give a compact installation as shown in the line drawing.

Booklets—"Saving Slippage and Space," and "The Lenix Drive in the Paper Industry," contain interesting data on belt drives. Send for them.

F. L. SMIDTH & COMPANY

50 Church Street *Engineers* New York, N. Y.

*Registered

Second Paper Industries Exposition

Held in the Grand Central Palace, New York City, April 7 to 12, 1924

IT WAS on the main floor of the Grand Central Palace that the Second Paper Industries Exposition was held this year, and this use of the main floor had many advantages over the position higher up in the building where the Exposition was held last year. It was easier of access, naturally, and there was no waiting for elevators. Due to the high ceiling, the main floor was much better ventilated, and perhaps best of all, the visitor came up a few steps from the street and the exhibits were spread out before him.

The booths did not bear numbers this year, for some reason, but with a diagram of the floor and a list of the exhibitors in his hand, the visitor could stand at the head of the stairs where he entered and locate in a moment the exhibit he wanted to visit first.

The exhibits themselves seemed to be even more interesting than last year. There were a number of new offerings in the way of machinery that brought interested groups of men into the booths, and there were more units of machinery in operation this year than last.

It was predicted last year that this year's Exposition would have more displays of interest to the layman, and among these was a collection of watermarked paper, some of it dating back to the thirteenth century, and following the use of watermarks from that time up to the present, modern water marking was exemplified by the work of Dard Hunter, which was truly remarkable. Some of Mr. Hunter's water marked sheets, which might have been made for exhibition purposes, showed a portrait of Mr. Hunter and his name watermarked in the paper. These sheets of watermarked paper were shown behind sheets of glass, framed in cardboard, and lighted from behind, so that the watermarks stood out as plainly as printing. Another exhibit of interest to everyone showed the actual making of paper by hand. Batteries of cameras and the frequent explosion of flashlights testified to the popular appeal of this exhibit, which was being given much newspaper publicity. Description of the exhibits will be found in their alphabetical order.

THE EXHIBITS

Booth 68. The American Association of Paper Specialty Manufacturers, of 152 West 42nd St., exhibited the products of their several members, which include crepe paper, toilet paper, napkins, tanglefoot, paper plates, cans, ice cream and oyster pails, cups, spoons, forks, and all converted specialties. Mr. J. E. Willert, of the above address, answered all questions concerning the work of the association and the qualifications necessary for joining it.

Booth 82. American Schaeffer & Budenberg Corp. and the American Steam Gauge & Valve Co., both of Brooklyn, exhibited together, and this exhibit centered around one of the most unique bits of mechanism at the Exposition. Because it was impossible to show a paper machine in operation, Mr. Carlier, the sales promotion manager, devised a poster showing the idler roll with a paper machine tachometer attached and in operation on the poster. This tachometer records the speed, breaks and all irregularities of operation. It seemed to be the only possible way of showing this device in operation, and Mr. Carlier was much congratulated upon his idea.

This booth also contained various recording thermometers and temperature controls for use in paper mills. (See Ill. No. 6.)

Booth 65. The American Paper Merchant, issued at Chicago, showed various printed inserts on all grades of paper that have been bound into their various issues. and copies f the American Paper Merchant and Convention Daily, which iting paper men found tucked under their doors every rning.

ooth 80. The American Voith Contact Company, 280 Mad- Ave., New York City, had a miniature of their cater- grinder in operation. Everything about the grinder, he tiny logs, were one-tenth of actual size. This is a chine, the first one having been installed for industrial ear and a half ago. Since that time they have put f these caterpiller grinders into operation. (See Ill.

8. The Armstrong Machine Works, Three Rivers, a glass model of the Armstrong Steam Trap work- team pressure. This model was so connected that ycle of operation, including the manner in which ndles air and sediment, could be seen. Users of steam traps who are interested in an individual trap for draining each paper machine dryer found this demonstration particularly valuable. (See Ill. No. 32.)

Booth 64. The A. W. Archer Co., 325 Broadway, New York City, had one of the interestingly colorful displays. Against a blue velvet background and case, the pyramids of balls of colored twine formed almost a spectrum of color. There were samples of colored sea island twine, white cotton twine, Highland and Granite brands of cotton twine, sash cord and braided clothes lines—hanks, 25 and 50-pound tubes and 5-pound sacks of twine, which showed the ways the various types of merchandise are prepared for sale. On the railing around the large booth were cones of twine in cone holders.

Booth 40. Bachmeier & Co., 430 West 37th St., New York City, had another of the colorful exhibits. On the wall of their booth was a spectrum in the form of a circle about four feet across, composed of 356 pieces of dyed silk. Each of these tints and shades can be duplicated in paper. A table held samples of colored paper arranged in related groups, one ranging from yellow to purple and another from orange through lavender, and blue to gray. Lake dry colors for coated papers were shown in bottles, also. (See Ill. No. 39.)

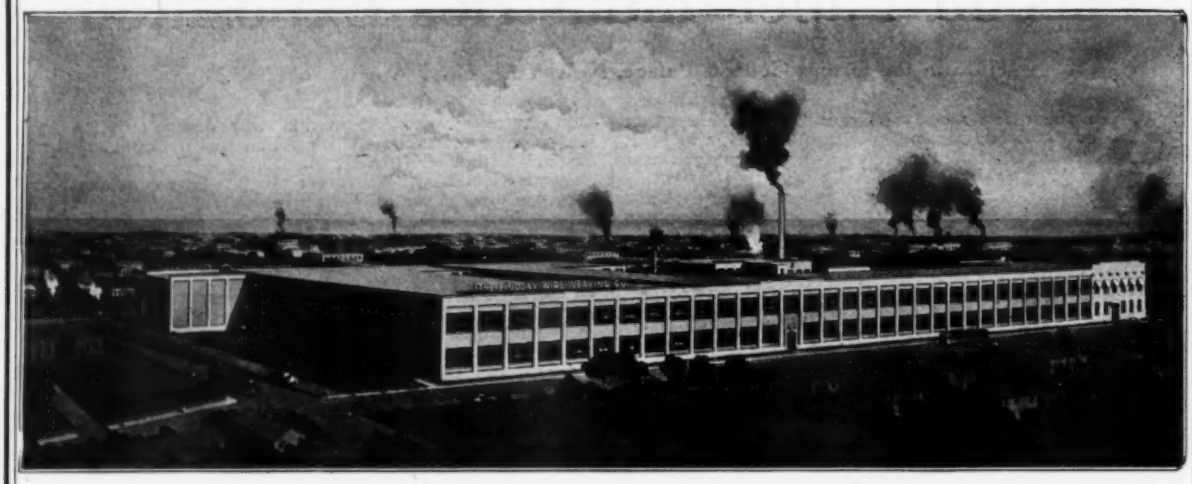
Booth 71. Charles Beck Machine Co., 609 Chestnut St., Philadelphia, Pa., had a Beck Automatic roll sheet cutter in operation, which showed how this machine takes the curl out of rolled paper while running it through to the knives. A special feature of the machine is an instant gear lever adjustment, which keeps the machine cutting to register. It has a capacity of 59,000 sheets in two hours.

Booths, 50-51. The Bird Machine Co., South Walpole, Mass., had a miniature model in operation showing the comparison of Pulmax short center belt drive as pulling against long center open belt drive. There was also on display a full size typical Pulmax short center beater drive; a Bird rotary screen which was one of twelve sold to the Oji Paper Co., Tokio, Japan; a Vickery Doctor, and a Vickery Felt Conditioner which was in operation; a Bird Saveall sold to the Stevens Paper Mills, and a Bird self-cleaning shower pipe. The men in charge of this display called particular attention to the felt conditioner, an English invention by F. W. Vickery, which has actually been on sale in this country only one month. In that month a number have been sold—and on a guarantee basis of eliminating all shut-downs due to wash-ups. When this felt conditioner is installed, it becomes automatic and keeps the felt continually in perfect condition, thereby increasing production by producing uniform paper. (See Ill. No. 26.)

Booth 34. The Booth Chemical Co., of Elizabeth, N. J., had a new type of their Booth Dry Feeder in operation, which is used in the application of "Boothal" to white water pulp, employed in this company's process of separating white water into pulp and water. The pulp recovered is made into paper and the purified water is used instead of fresh water. This display also included jars of white water before and after separation. (See Ill. No. 56.)

Booth 6. The Cameron Machine Co., of Brooklyn, N. Y., showed three sizes of their roll winding machines, all under power, so that demonstrations were given as if these machines were in their respective places in the various industries. Their No. 6 machine produces small rolls for adding machines, gummed tape, etc.; No. 10 for slitting and rewinding bag papers; and No. 18 was a mill machine for rewinding and trimming. Here also were two pyramids of sample rolls, the largest being a 60-inch roll of board for making 9-inch spiral cartons, and the smallest a tiny roll of colored tape. (See Ill. No. 36.)

Booth 62. The Continental Paper & Bag Mills Corp., of New York City, was one of the most unique of the exhibits. It consisted of a house built entirely from paper products manufactured by this corporation. The foundation was of 36-inch rolls of wrapping paper, the posts that held the roof were of rolls of toilet paper, and the roof was formed of egg cartons. An awning extending from the roof was made of blue and yellow bags. Their complete line of specialty bags was displayed on the walls of the booth, and on the counter were jars showing each of the three processes of paper making—the wood, the pulp, the chemicals, etc. Thanks are due to the Continental Paper & Bag Mills Corp. for the film showing the process of paper making, with views of their various plants, which was shown during the week. (See Ill. No. 14.)



LINDSAY FOURDRINIER WIRES

Known for Dependable Value

Made in various meshes from No. 50 to No. 100

All widths from the narrowest to the largest wires used anywhere

We also make and carry in stock

Brass and Phosphor Bronze Cylinder Wires from No. 14 to No. 100 mesh

THE LINDSAY WIRE WEAVING CO

COLLINWOOD STATION, CLEVELAND, OHIO

Booth 92. The Crane Co., 19 West 44th St., New York City, had a vast array of valves, which included a steam separator float valve, an engine stop valve, a water relief valve, pop valves, stop check valves, back pressure valves, tilt traps and other fittings. A very popular feature in this booth was the drinking fountain—one of two places where drinking water was available on the floor, and to this concern ought to go a vote of thanks for their thoughtfulness. (See Ill. No. 21.)

Booth 101 was occupied by the Daily Mill Stock Reporter, published by the Atlas Publishing Co., of New York City. Copies of the daily, as well as their Waste Trade Directory and their Waste Trade Journal, were on display.

Booth 87. The R. and J. Dick Co., 145 Lafayette St., New York City, had numerous samples of their Dick Balata belt —a waterproof fabric belting that was shown with various joinings, as it is used for transmission, elevating and conveying purposes. (See Ill. No. 37.)

Booth 33. The Dorr Company, 217 Park Ave., New York City, exhibited in operation the Dorr Save-All, a machine for reclaiming white water stock, using the principle of continuous sedimentation. A great bunch of pink sweet peas in a blue bowl added a welcome bit of color to this booth. (See Ill. No. 3.)

Booth 57. Downingtown Mfg. Co., Downingtown, Pa., showed a model of a new suction roll, one of which has been installed at Laurentide Paper Mill, Grand-Mere, Canada. This suction roll is unique in several ways—there is nothing inside the roll to get out of alignment, there is infallible alignment of suction box to shell; common sense bearings about one-half diameter of shell; no wear on packings, therefore no replacements required, and direct jaw clutch connection to driving shaft. A tiny laboratory beater with bed plates at both top and bottom to facilitate beating; ground joint for dryer steam connection, and a single spring and screw adjustment collapsible winder shaft in which the shaft runs all the way through the shell, making a very stiff shaft—these completed this display. (See Ill. No. 40.)

Booth 48. The Electric Tachometer Corp., 310 N. 11th St., Philadelphia, Pa., had erected on two large boards their recording and indicating tachometers, their electric signaling devices, their electric position indicators and an electric liquid level recorder. The especial feature is the new recording tachometer which shows at long distance the speed at which paper is produced, all breaks and stops, and at same time shows continuously the total amount of paper manufactured. Accuracy of the machine is entirely controlled by the master clock, and the device is so constructed that a clock can control and synchronize any number of recorders, thus saving an enormous amount of time and maintenance. (See Ill. No. 48.)

Booth 10. The Electro Bleaching Gas Co., 9 East 41st St., New York City, provided one of the most comfortable resting places on the floor. Here were comfortable chairs, a soft, downy davenport, lamps that gave the place the atmosphere of the home, with a group of ferns and plants to complete the restful atmosphere. The feature of this booth was a display of photographs showing what they have done in the substitution of liquid chlorine for bleaching powder in the manufacture of bleach liquor. This work of substitution extends back over a period of about five years, in which over a hundred mills in this country and Canada have come to use liquid chlorine successfully.

Booth 12. The Faatz Mfg. Co., Fredericksburg, Md., had a pyramid of the actual containers of their power-saver—a dressing for all kinds of belts and rope drives, together with a number of sample cans of this belt dressing which are being mailed to the office of manufacturers who request that these samples be sent them.

Booth 46.—The Farnsworth Company, Norristown, Pa., had on display here the various units of their drying system, pistonless condensation pumps and boiler feeding system. At the time of writing this, it was impossible to separate Mr. Farnsworth from the men who were interested in these huge tanks and rolls long enough to get more accurate descriptions of the units. From the number of men who were continually in this booth, this display must have been exceedingly interesting. (See Ill. No. 22.)

Booth 84. Foreign Paper Mills, 72 Duane St., New York City, had the Schopper world standard paper testers in operation. There are folding testers, weight testers, tensile strength testers, micrometers for testing thickness, capacity testers, beating tester, hygrometer for testing the relative humidity of the air, lengthometers to give yardage, and speedometers for paper machines.

Booth 89. The Frederick Iron & Steel Co., Frederick, Md., had in their booth full size stock pump, boiler feed pump and two vacuum pumps, as well as their new expanding and contracting paper roll. (See Ill. No. 4.)

Booth 69. This booth was occupied by the display of samples of work done by the various members of the Greeting Card Association—some fifty-four concerns in all. On the walls were copies of the Association's advertisements which have appeared in the Ladies' Home Journal and Good Housekeeping during 1923 and this year. Dealers' helps and supplies were also shown, to demonstrate the work done by the Association for its members.

Booth 16. The General Electric Co., Schenectady, N. Y., had in operation an electric steam generator with a capacity of one B. H. P., a miniature of the 500 B. H. P. generator installed at the Union Bag Mill, Hudson Falls, N. Y. Also, there was in operation an electrically operated flow meter, one section of sectionalized paper machine drive control board. (See Ill. No. 57.)

Booth 61. Gibbs-Brower Co., 261 Broadway, New York City, are pulp and paper mill brokers. They installed a typewriter with a stenographer in charge, who wrote letters for visitors. Lists of the mills now in their hands were displayed, as well as samples of their Go-Between Bulletin which is sent periodically to all paper mills in this country and Canada. These people also sell used pulp and paper machinery. (See Ill. No. 13.)

Booth 44-A. The B. F. Goodrich Co., of Akron, Ohio, featured three new rubber products for the paper industries that kept this booth crowded with men. The Goodrich Cutless bearing was in operation with no lubrication except a mixture of water and sharp sand. The splashing of water in a glass tank on which red and orange lights played captured the attention, and then the visitor stayed to learn the story. The second big feature was a high speed news press roll, temporarily removed from service after nine months' operation, with no signs of corrugation. Visitors had the opportunity of making plastometer tests of the extremely soft rubber covering. The third new item was the new "1788" transmission belt recently developed by the Goodrich Company to contend with extreme drive conditions in paper and pulp mills. (See Ill. No. 17.)

Booth 2. Marlin-Rockwell Corp., successors to the Gurney Ball Bearing Co., of Jamestown, N. Y., displayed a journal mounting for press roll manufactured by the Bagley & Sewall Co., of Watertown, N. Y., equipped with Gurney ball bearings, the same as used in the Algonquin Paper Co., Ogdensburg, N. Y. Various types and sizes of ball bearings were also shown.

Booths 52-53. The Hammermill Paper Co., Erie, Pa., occupied the two large booths facing the entrance to the Exhibition, and here were a long table with sample books, portfolios, and many examples of the uses of paper that were interesting to men who sell and men who use paper. Comfort was a consideration in arranging these booths, and the visitor found his visit prolonged because he had been made so comfortable. A feature of the Hammermill display was the Delineascope, an electrically operated machine which showed pictures illustracting the paper making processes in use at the Hammermill plants. This is the first machine of its kind in commercial use, and is made by the Spencer Lens Co., of Buffalo, N. Y. It is quite compact, and it replaced the number of glass plates used last year for this same purpose. (See Ill. No. 45.)

Booth 47. Wm. A. Hardy & Sons Co., Fitchburg, Mass., showed flat phosphor bronze screen plates, copper plates for rotary screens, one completed screen cylinder, and a complete line of acid resisting valves for sulphite mills. The line of valves included blow-off, globe, Y and swing check valves. (See Ill. No. 52.)

Booth 86. The Hoe Corporation, Poughkeepsie, N. Y., displayed a new and unusual wrench, demonstrated by a unique device that keeps the wrenches continually in operation. The wrench is at present made in 6, 8, 10, 14 and 18-inch sizes, and large ones of 24, 36 and 48-inch sizes will soon be put on the market by this company. These wrenches are comparatively new, and in the short time they have been offered they have been adopted for use by a number of various industries.

Booth 81. Keystone Lubricating Co., Philadelphia, Pa., emphasized safety and the prevention of accidents while oiling machinery by the use of their system of pumping lubricants to the bearings. On a board on the wall of their booth was the word "safety" spelled out in metal tubing, through which grease was being forced to demonstrate their process. A great many photos in a rack were evidence of the popularity of this lubricating system in widely varied industries. Also on display were various manifolds for outlet of lubricant. Since last year's Paper Exposition, approximately two hundred separate sales of this system have been made. (See Ill. No. 9.)

Booth 78. The Kleen Products Company, of North Wales, Pa., had one of the displays that interested the housewife as

TICONDEROGA PULP & PAPER CO

ESTABLISHED 1882

MANUFACTURERS OF

FINE QUALITY BOOK PAPERS

AND

Bleached Keebra Poplar Pulp

SPECIAL MAGAZINE
SPECIAL COVER
COLONIAL OFFSET
MACHINE FINISH
ENGLISH FINISH
ANTIQUE LAID
SCHOOL TEXT
LITHOGRAPH
LEGAL BOOK
EGGSHELL
COATING
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MILLS AT
TICONDEROGA, N.Y.

SALES DEPARTMENT
522 FIFTH AVENUE
NEW YORK, N.Y.

well as the vendor of lunches. Here were forks, spoons and even combs made of cotton fibre, and so firm that they can successfully replace these utensils made of other materials. There were also plates, napkins, tablecloths, and boxed picnic sets. The comb especially ought to be popular as a souvenir, for it can easily bear the printed compliments of the giver. These products are arranged on the wall of the booth, and on a table within reach of the passers-by.

Booths 74-75. The Leather Belting Exchange, 417 Forrest Bldg., Philadelphia, Pa., had in operation a miniature of the 100 h.p. testing machines at Cornell University, on which tests were run for the visitor to show the comparative values of the various types of belting. Waterproof leather belting was run under water to show its value. This is a comparatively new thing, and attracted much interest. A workman from a factory demonstrated the joining of endless leather belts—a process of paring and gluing that attracted many visitors. (See Ill. No. 28.)

Booth 28. The Locke Regulator Co., Salem, Mass., showed reducing valves for maintaining an even heat on drying machines, using live and exhaust steam in combination with one regulator. Here, also, was a miniature of the Locke engine stop and speed limit system for stopping fly wheel explosions, and a safety boiler stop valve which closes automatically when a tube in the boiler ruptures, thus preventing a return of steam from other boilers. (See Ill. No. 38.)

Booth 14. The Lubriko Co., Philadelphia, Pa., showed, through the use of a model of a journal box, in operation, the high melting point of their brick grease, which was invented by J. C. Person, president of the company. The grease contains no fillers, and is 100 percent lubricant, which, with its heat-resisting qualities, have found it favor in about 100 paper mills. Several other grades of grease were exhibited in jars and one was shown in a glass-covered gear box, in which the gears were operating.

Booth 10. Lehigh Lime Co., 111 West Washington St., Chicago, Ill., showed several jars of chemicals, a chart giving a representative analysis and a picture of their plant. The booth was equipped with comfortable chairs, where visitors could comfortably ask and receive advice concerning their bleaching problems. (See Ill. No. 16.)

Booth 41. The Mathieson Alkali Works, Inc., New York City, exhibited a miniature of the Mathieson Multi-Unit Chlorine Gas Tank Car, which was recently approved by the Interstate Commerce Commission as their main exhibit. These cars are made by the Standard Steel Car Co., and hold many tanks as long as the car is wide. The model, which is complete in every detail, showed the many unique features of the multi-unit car, together with the unloading of their liquid bleach and other chemicals by means of a manifold and headers. A full size Mathieson ton container, as used on this car, was also exhibited, sectioned at one end to show the construction in detail. Literature and samples of their caustic soda, soda ash and bleaching powder were furnished to those interested. (See Ill. 41.)

Booth 70. The Mayer Coating Machines Co., Rochester, N. Y., were equipped with photos and printed matter descriptive of all classes of paper coating machinery which they manufacture, including wax coating and oil saturating machines, gumming and gluing and varnishing machines, asphalt coating and duplexing machines, clay coating and color coating machines, etc.

Booth 48. Midwest Air Filters, Inc., 100 E. 45th St., New York City, exhibited single units of their air compressor filter —a self-contained unit consisting of one or more filter cells; a filter for the textile trade for removing long lint fibers from the air; various sizes of smaller air compressers, and a working model consisting of a filter unit in operation. (See Ill. No. 58.)

Booth 71. The Mixing Equipment Co., 50 East 42nd St., New York City, had in operation several of their portable mixers, which are built to fit on any kind of a container. These mixers are built so that they are adjustable to any position, and are made to mix quantities from one gallon to one thousand gallons. They are used in 56 different lines of industry.

Booth 42. Nash Engineering Co., S. Norwalk, Conn., exhibited a full size ejector suitable for handling stuff, which consists of a closed cast iron pot containing a ball float mounted on an arm, which is controlled through an automatic starter. This exhibit consisted of a complete line of Nash and Jennings Hytor pump equipment as used extensively in paper mills. One of the features was the Jennings flat box pump, which was introduced last year. Another was a comparison of the old and new models of the dryer exhaust unit. (See Ill. No. 15.)

Booth 8-A. National Aniline & Chemical Co., 40 Rector St., New York City, had two cases filled with glass jars showing pulp colored with their various dyes, the most important ones being the new sulphur black and sulphur brown. The jars were filled with pulp and water, to show the fastness of the dye to water and all of the dye taken up by the pulp, and the colored pulp settled to the bottom of the jars, leaving perfectly clear, untinted water above.

There were also many colorful samples of paper, to show the results of National dyes on every type of paper. These are all-American dyes, made entirely from American products. An interesting bit of news was given here, that today only 10 percent of the dye used in America is imported, whereas before the World War, the imports amounted to ninety percent of the dyes we used.

Experts were in charge of this booth, ready to give advice on color problems to troubled ones, and this service was taken advantage of quite extensively. (See Ill. No. 23.)

Booth 84. National City Paper Corp., 72 Duane St., New York City, showed samples of their bond paper, ledger paper, greeting card bristols and cover papers. (See Ill. No. 50.)

Booth 31. The Norma Co. of America, Long Island City, N. Y., centered their display around a minimeter for measuring paper graduated to one-twenty thousandth of an inch. They showed their unusually precise roller bearings which have ball bearing tolerances and roller bearing load carrying capacity; bearings in sections, which they said, is the first time these have been shown. They also had a full display of Norma thrust bearings, open and closed types of ball bearings, and ball and roller bearings with hangers and pedestals. (See Ill. No. 12.)

Booth 76. The New York Employing Printers' Association of New York City, a local organization for the promotion of better printing, and actually a branch of the U. T. of A., had two large glass cases that gave the visitor a chance to compare ancient methods of printing with modern methods. A Japanese wood block together with the tools with which it was laboriously cut by hand, a chained book printed in Venice in 1480, a Singalese palm leaf book beautifully written with a stylus, and two interesting pieces of printing that date from 1800, were the high lights of the exhibit. One of these pieces of printing was the first price list of printing published in New York, dated May 18, 1795. The other was a plea made by the master printers of New York in 1800 for higher wages, and set forth that no journeyman employed in a book office should receive less than seven dollars a week, nor those on daily papers less than eight dollars a week! (See Ill. No. 19.)

Booth 22. The New York State College of Forestry, of Syracuse, N. Y., showed by means of two stereomotorgraphs, illuminated pictures and some charts, the vital need for reforestation of our waste lands and some of the processes by which this can be done. Their display was purely educational. The exhibit was planned and arranged by Prof. I. L. Lee, who was in charge of the college's fairs and exhibits.

The work of the students was shown by means of pictures, as was also the work of the conservation commission, who, by the way, are sending out ten million trees for planting in 1924. (See Ill. No. 24.)

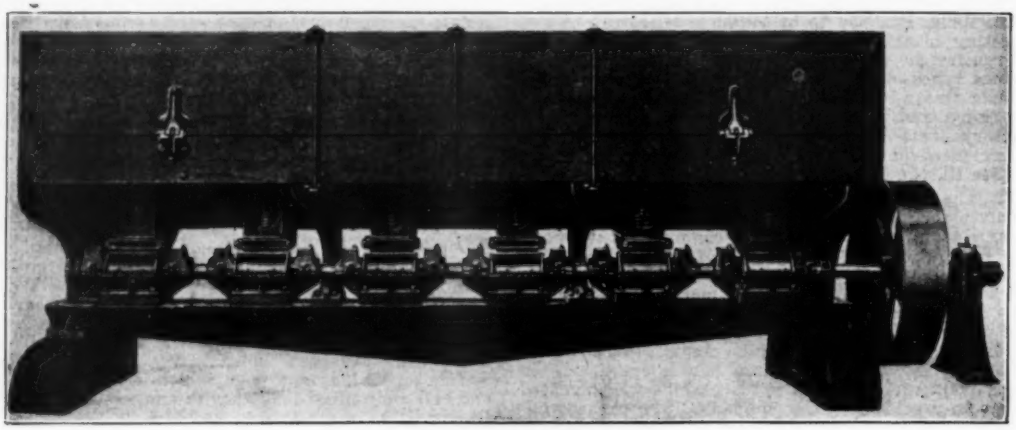
Booth 5. Oliver Continuous Filter Co., 34 West 42nd St., New York City, exhibited one of their filters in operation, showing the filter drum equipped with press rolls for thickening pulp before bleaching at high density. The pulp leaves the filter 30 percent air-dry. When used as a Save-all, the Oliver recovers over 95 percent of pulp in waste water and at the same time gives high capacity. (See Ill. No. 11.)

Booth 32. Oneida Chuck Co., Rhinelander, Wis., displayed a new roll collar designed for use with paper cores on which paper rolls are wound. This new device allows the use of a cheap non-returnable core, and allows the roll to be run down to the last thickness of paper without injury to the core. It can be furnished for any shaft size or core, as was demonstrated by the different sizes on display. The castings are made of malleable steel and are practically indestructible, and will work on iron or metal-tipped cores equally well, if necessary. This new chuck is endorsed by the Marathon Paper Mills, the Daniels Manufacturing Co., and the Rhinelander Paper Company, who have it in use in their plants. It was publicly shown for the first time at the Paper Industries Exposition. (See Ill. No. 43.)

The various trade papers of the industry were distributed from booths on the floor, all of the papers being represented.

Booth 43. The Permutit Company, 440 Fourth Ave., New York City, had on display one of their domestic size water softeners, which will remove from the water all trace of calcium magnesium. Photos and sketches of their oil removal apparatus for the removal of oil from condensate to make the water suitable for re-use as a boiler feed supply were shown,

Pulp and Paper Mill Machinery



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Made in **All Sizes from 6 to 18 Plates Inclusive**

Grinders

Three and Four Pockets

Equipped with **all Latest Devices** including our **Patented Pulp Scraper between the pockets.**

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Chippers

Made in 48″, 84″ and 90″ sizes, right or left hand; three or four knives.

The 48″ chipper is intended for small wood or slabs.

Our patented improvements make the production of clean, evenly cut chips, free from slivers, possible.

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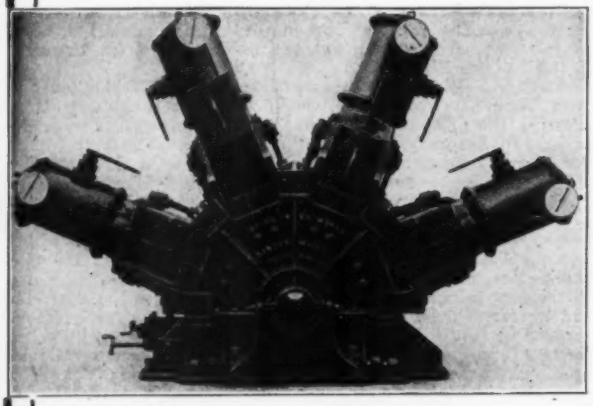
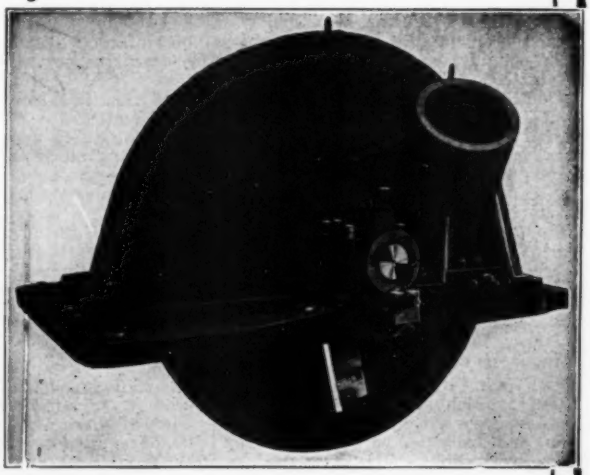




We also manufacture Cylinder Molds, Wet Machines, Barkers, Pumps, Iron, Brass, Bronze and Lead Castings

Union Iron Works, Bangor, Maine

since the actual apparatus is too large to be shown on the floor of the Exposition. Written recommendations by some of the largest and best known paper manufacturers may be seen, also. (See Ill. No. 51.)

Booths 18-19-20. The Paper Makers Chemical Co., of Holyoke, Mass., and the **Western Paper Makers Chemical Co.**, of Kalamazoo, Mich., combined their displays in these three booths. The most popular exhibit at the Exposition, judging from the crowds always around it, was the reproduction of an old mill and the demonstration of hand-made papermaking by Dard Hunter, who, with several assistants, made sheet after sheet of water-marked paper from pure rag stock.

The Superior Emulsifying System, showing the use of rosin, size, was illustrated by means of a small model run in connection with a laboratory beater. Here, also, were samples of all the different chemical products of this company. (See Ill. Nos. 49, 54.)

Booth 28. The Potdevin Machine Co., of Brooklyn, N. Y., had in operation a label-gluing machine, and a two-color flat and square bag machine. This concern makes 41 different types of bag machines, as well as a general line of paper converting machinery, photos of which were shown on a display board together with the various products of these machines. Early in the week of the Exposition, this concern took an order for four self-opening square bag machines to go to Port Natal, South Africa.

Booth 36. Pennsylvania Salt Mfg. Co., Philadelphia, Pa., have had a varied career. When the concern was organized in 1850, they handled only salt, then they went into petroleum refining and then heavy chemicals. At present they specialize in alums, especially Natrona Porus Alum, liquid chlorine and bleaching powder, as well as a general line of acids and heavy chemicals. Their booth contained a 725-lb. drum for bleaching powder, cylinders in which chlorine are shipped, photos, and samples of the various grades of alum and soda which they supply. (See Ill. No. 25.)

Booth 65. The Purity Paper Vessels Co., of Baltimore, Md., exhibited their various paper cans, milk bottles and other containers, together with various appliances manufactured for the purpose of furthering the use of containers and rendering them more easy to handle as original packages.

This company is exceptionally keen to discover and teach new uses for paper food containers. Their exhibit savored of exceptionally efficient sales service. (See Ill. No. 42.)

Booth 93. The Reed Air Filter Co., Louisville, Ky., displayed a bank of fifteen units capable of filtering 15,000 cubic feet of air per minute. By means of a special preparation, these filters are made rust resistant and resistant to acid action and corrosion, and some of the units on display were shown only half covered with the preparation, to show the virtue of the preparation. An interesting test rig, composed of a motor, variable speed clutch, fan, filter and filter casing, in operation, demonstrated their dry air filter, which they guarantee to remove 97 percent of the dust and dirt from the air, including carbon particles and air bacteria. (See Ill. No. 31.)

Booth 94. J. O. Ross Engineering Corp., 30 E. 42nd St., New York City, had in operation a model of their Briner Economizer in connection with vapor absorption system and heating systems. Photographs of various installations were on view. (See Ill. No. 44.)

Booth 94-A. Smith & Serrell, of Newark, N. J., selling agents for The John Waldron Corp., of New Brunswick, N. J., had a display board on which were Francke Flexible Couplings and the various small sizes of steel pin units for Francke Flexible Couplings. A life-size poster of the No. 48 double Francke Flexible Coupling, having bores 17⅞ by 13⅞, a cross-section of couplings, and models to show the comparison between the ordinary couplings and Francke Flexible Couplings when shafts are out of place, completed the display.

Booths 60-72-73. The Sandusky Foundry & Machine Co., Sandusky, Ohio, featured in their display a 36-inch diameter perforated bronze shell 305 inches long, for a paper machine having a 234-inch wire, which is one of seven such shells, and is now being shipped direct to England. The size of the shell attracted all passersby, who were heard commenting on the placard, which says that the complete shell weighs six tons, and that the original casting weighed 26,000 pounds.

Two new Cycloidal Vacuum Pumps of special design, which this company is just about to put upon the market, were shown. These have a chilled interior surface, making them particularly resistant to the acidity of the water in a paper mill. A two-ton shell shown was so perfectly balanced that it could be turned over by hand. In addition, there were various items of interest to textile manufacturers. (See Ill. No. 1.)

Booth 8. The Seaboard Air Line Railway, Savannah, Ga., came to the Paper Industries Exposition with the object of telling paper manufacturers what the South has to offer the pulp and paper industry. A folder which they have prepared for distribution is printed on paper made from a carload of Southern pines and gums sent by the Savannah Lumber Co. and the Savannah Board of Trade to the Forest Products Laboratory at Madison, Wis. Samples of wood, pulp, growing trees, kaolin, limestone, all from the South, together with maps and photos, told the story of the possibilities of the South—and paper men agreed that it was an interesting story.

Booth 44-B. The Sealright Co., Inc., Fulton, N. Y., exhibited their cone-shaped milk bottles of waxed manila sulphite, in sizes from half pint to one quart. Their cylindrical containers, which are made in sizes from a quarter pint to two and a half gallons, have some eight hundred odd uses, so we were told. One of the valuable items shown was a packing tray with cylinder for delivering ice cream. The ice cream is packed for delivery directly in the cylinder, and the cylinder is packed in ice and salt in the tray, which is of paper, and therefore not necessary to return to the ice cream company.

Booth 85. The Seminole Chemical Co., 75 Vesey St., New York City, explained their Seminole method of cleaning boilers and keeping them clean, and they say that their method is unique in that its efficiency is due to physical *adsorption* of scale-forming salts. At this booth they demonstrated the action of its cleaner microscopically, and presented data in printed form by which chemists may prove every claim they make. Samples of scale which have been removed were on display. (See Ill. No. 8.)

Booth 2. The Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., had installed in their booth a one-ton Lift About on an I-beam track which was electrically operated for demonstration purposes. This Lift About is particularly adapted for handling rolls of paper. Photos of cage controlled monorail hoists and overhead electric traveling cranes and transfer systems for paper storage with switches and curves proved the usefulness of the various installations. (See Ill. No. 35.)

Booth 17. The SKF Industries, Inc., 165 Broadway, N. Y., had as an exhibition piece a bit of mechanism for which they had no exact name, which was on display at the Machinery Show at Stockholm, Sweden, and which was used to show the free running, the ease and lack of friction in their bearings. Its slow, gentle motion as one pendulum dropped a tiny steel ball and then rose gracefully only to descend when the other pendulum dropped its tiny steel ball, caught the attention, and kept this booth full.

The most interesting thing to paper men in this booth was the trunion mount for dryer cylinders, which is now in use on several ball bearing machines. There were also several typical housings for table rolls, dryer felt, and wire or press felt rolls, as well as their self-aligning roller and ball bearings of all sizes. (See Ill. No. 2.)

Booth 90. F. L. Smidth & Co., 50 Church St., New York City, had in operation a model designed to show power loss through belt slippage. The demonstration was made by means of a flickering light operating in synchronism with a white cross painted on the black surface of each of the three large pulleys of the drives. One drive was equipped with a Lenix and a Prony brake. The open belt drive was also equipped with a Prony brake. The third drive of the model ran idle. Under the flickering light the cross on the open drive was shown to revolve backwards at a rate considerably faster than the cross on the Lenix drive, and the difference represented the difference in the power transmitted. (See Ill. Nos. 29, 34.)

Booth 67. Under the name of the Southern Kraft Manufacturers, The Albemarle Paper Company and the Hummel-Ross Fibre Company exhibited various colored kraft in rolls of all sizes, bags made from their papers, and chips of wood from which this paper was made. Retailers on the alert for distinctive wrapping paper certainly found it there.

Booth 3. The W. S. Tyler Company of Cleveland, Ohio, had in operation their electrically vibrated "Hum-Mer" screen for knotter and saw dust screen, and were showing as well a cross-section of this "Hum-Mer," testing sieves, Fourdrinier wires, cylinder cloth and woven wire screens of all kinds. (See Ill. No. 33.)

Booth 98. Tide Water Oil Sales Corp., 11 Broadway, New York City, operated a set of gears in a gear box to demonstrate the use of their Tyrol gear coating, and included in their display samples in bottles of various industrial oils and greases suitable for paper machinery and general lubrication. (See Ill. No. 55.)

Booths 54-55. The Union Bag & Paper Company, 233 Broadway, New York City, and associated companies and branches exhibited samples of the great variety of special bags which they make to order. In this display one could follow the prod-

KALAMAZOO VEGETABLE PARCHMENT CO.

Manufacturers of

PARCHMENT, WAXED AND BOND PAPERS

KALAMAZOO, MICHIGAN

KVP

Papers:

(FOUR DIVISIONS)

Bonds and Ledgers

Six colors and White *Standard weights* *White and Buff*

The most value for your money this side the pearly gates.

Genuine Vegetable Parchment

The accepted reliable protection for moist and greasy foods.
"Better Wet than Dry"

Bread Wraps—Waxed Papers

The "Stay Put" Kind
Printed or Plain.

For wrapping dry foods and
lining cartons.

Paper Specialties for Homes, Institutions, Hospitals, Etc.

Handy Household Rolls:
Waxed Paper
Parchment
Shelf and Lining Paper

Papricloth Sheeting
Ice Blankets
Obstetrical Sheets
Druggists' Powder Papers

Banquet Table Cover Paper

For churches, lodges, societies, cafeterias, etc.

uct from the forest to the consumer, for there were a huge log of spruce, wood chips, ground wood, samples of both sulphite and sulphate pump, rolls of bag paper, and completed bags of every description. (See Ill. No. 7.)

Booth 39. The United States Testing Co., Inc., 340 Hudson street, New York City, had on display a full line of laboratory equipment for the testing of paper, including tensile strength and stretch machine, a tearing tester, a machine for testing bursting strength, another for testing the folding endurance, micrometers, scales, and a microscope with slides to show the different fibres. (See Ill. No. 10.)

Booth 38. Union Sulphur Company, 33 Rector street, New York City, furnished their booth for comfort, and there was always someone in charge to talk about their product, which is crude sulphur.

Booth 80. Valley Iron Works Company, Appleton, Wis., had on display miniature models of their pulp and paper mill machinery. Their high pressure stock inlet for which they claim a uniform sheet by the elimination of slices, a laboratory beater of the Niagara type, a Valley size tester, a P. A. P. A. pulp and paper screen, a rotary inward flow screen for both paper and pulp machines, formed an exhibit which attracted much attention. (See Ill. No. 47.)

Booth 88. Voorhees Rubber Mfg. Co., 20 Bostwick avenue, Jersey City, N. J., had on display their Sensation line of "Rub-Steel" valves in sizes for water, steam and vacuum pumps, as well as belts and air, steam and water hose. (See Ill. No. 20.)

Booth 66. Westfield River Paper Co., Inc., 350 Madison avenue, New York City, provided a blue velvet background for their samples of embossed glassine in white and colors, including gold and silver. A means has been found for making the embossed glassine in colors, which will be offered commercially in about thirty days. At present the colored glassine is not embossed,—their embossing having been done entirely on white. The samples of colored embossed glassine were entirely hand-made, but a process has been discovered for embossing the colored glassine by machinery. Their glassine is for sale in both rolls and sheets, and the display included both. (See Ill. No. 18.)

Booth 4. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., had in operation their latest development in speed control for sectional drive for paper machines. A motor gear unit and compact speed regulator, with control panel for sectional drive were shown as part of this unit. This outfit went to the Brown Paper Mill Co., of West Monroe, La., after the show, and will make up part of the largest and fastest kraft machine in the world.

There was also a display of a material called "Micarta" made of laminated kraft paper and phenolic condensation product as a binder, which is used in the radio field for panels and tubes for vario-couplers, although its most extensive use is in noiseless gearing, and in airplane propeller and pulley work. (See Ill. No. 53.)

Booth 57. William Bond Wheelwright, 270 Congress St., Boston, Mass., exhibited samples of the work he has done for the paper industry, including printed matter for Albany Felt Co., Falulah Paper Co., District of Columbia Paper Mfg. Co., and George W. Wheelwright Paper Co. Mr. Wheelwright has been identified with the printing and paper business for twenty years.

Booth 53. White & Wyckoff Mfg. Co., Holyoke, Mass., and the United States Envelope Co. are official converters of Hammermill Bond Papers, and their products were shown in the Hammermill booths.

Booth 20. C. K. Williams Co., Easton, Pa., showed samples of their mineral pigments, copper reds, ochres, umbers, siennas, mineral and carbon black, asbestine, terra alba, talc and china clay.

The Knickerbocker Photo Service, 110 West 40th street, New York, who were the official photographers of the Exposition, displayed in their booth the various sorts of commercial photographs they make.

EXPOSITION PROGRAM

Every effort was made this year to make the Paper Industries Exposition an improvement over last year's Exposition, and to include some features of interest to the general public. Among these was a collection of watermarker paper made—and collected—by Mr. Dard Hunter of Chillicothe, Ohio, which was displayed behind glass, with lights behind the various samples of paper, to make the water marks easily visible. Mr. Hunter was in charge of the making of hand-made paper, which was a feature of the booths of the Paper Makers Chemical Co., where the process of making paper by hand was demonstrated constantly during the entire week of the Exposition.

Thanks are due to a number of concerns, whose names follow, for moving pictures, of great value, which were exhibited every afternoon and evening, except Thursday afternoon, when the room was used for a meeting of the TAPPI. Credit for the moving pictures is due as follows:

Thirsty Fibre—Courtesy of the Scott Paper Co.

From Spruce to Newsprint—Courtesy of G. H. Mead Co.

Manufacturing and Hanging Wall Paper—Courtesy of the Wall Paper Manufacturers' Association.

The Cup of Health—Courtesy of Individual Drinking Cup Co.

President Harding's Alaska Tour—The Alaska Railroad.

Snow Motor Logging—Courtesy of Armstead Snow Motors Co.

Canadian Sulphite Pulp Industry—Courtesy of Riordon Pulp Corp.

Making Paper—Courtesy of Whiting Paper Manufacturers' Association.

Romance of Paper—Courtesy of Butler Paper Co.

Making Fine Paper from Rags—Courtesy of Strathmore Paper Co.

Making Tissue Paper—Courtesy of Crystal Tissue Co.

On Thursday afternoon, the meeting of the Technical Association was not very well attended, probably due to the fact that the visitors did not know where the meeting was being held. The Exposition had its largest crowd on Thursday afternoon, and many of the visitors missed a very interesting and informative meeting, very probably because no effort was made to go out after them. Such men as found the room where the meeting was held said that they enjoyed the carefully written papers, and regretted that their friends missed it.

The first paper was by M. C. Fleming of The Dorr Company of New York City, and explained the structure of the Door Save-All, its operation and its advantages, in the eyes of its makers, over other makes of save-all.

The second speaker was L. M. Booth, of the Booth Chemical Co., whose subject was "White Water Economy," and he went a step further than the first speaker, telling how the decomposition of stock may be prevented by the use of chemicals. He advocated coagulation by chemicals, followed by sedimentation, thereby eliminating the production of slime and decomposition. "The only save-all that saves all," he concluded, "is one that reclaims all."

R. H. Whitney of the B. F. Goodrich Rubber Co. read a number of statistics to illustrate his talk on "Special Soft Rubber Press Rolls for Paper Machines," which he said had proven very satisfactory in the following ways especially: water removed is equal and sometimes in excess of water removed with hard rolls, felt washing is reduced a varying amount in some cases up to 70 per cent, the life of a felt is from 25 to 50 cent longer because the soft roll protects the felt, it is possible to use more pressure with a soft roll without injury to either sheet or felt, and a harder twisted felt can be used with a soft roll, which tends to lengthen the life of the felt. He mentioned eight rolls that have been in use for an average of 4½ months each with no corrugation, and commented upon the soft roll which is on display that has been in use for nine months and is to go back after the close of the Exposition without grinding. It is not necessary to regrind these soft rolls any oftener than hard rolls, and they will run without objectionable corrugation. Greater pressure per unit area is possible than with hard rolls, extra yardage is gained, and it is possible to use more open felts.

George H. Spencer, of SKF Industries, read a paper titled "Ball and Roller Bearings and Their Effect on the Paper Industry," which he said was based on the bearing industry as a whole, rather than just the experience of the SKF Industries. He explained the difference between plain bearings that must be run on an oil film as against ball and roller bearings which are designed to carry a load on a metal to metal contact. He explained why the alignment of bearings has so much to do with the life of a felt, and illustrated his talk with slides showing the manufacture of ball and roller bearings, and many different types of installations.

Charles A. McKeand of the Seaboard Air Line spoke on the subject of "Paper Making Opportunities in the South," covering the availability of materials, the cheaper cost of pulpwood, the nearness of the kaolin mines of Georgia to the territory under discussion, the cheap power, the nearness of the markets, and the high quality of American-born labor. He spoke of the advantage of the climatic conditions of the South. in that the bill for heating is much less, and the type of building is less expensive because of the milder climate.

The

St. Regis Paper Company

and the

Hanna Paper Corporation

Daily Capacity, 425 Tons

Newsprint
Butchers' Manila
Packers' Oiled Manila
Jute Container Board
Ground Wood & Unbleached Sulphite

Manufacturers of

TARZAN Fibre Shipping Cases

General Sales Office

30 East 42nd Street, New York

620-621 McCormick Bldg.
Chicago, Ill.

1117 Farmers Bank Bldg.
Pittsburgh, Pa.

W. W. Spratt, Westinghouse Electric & Mfg. Co., spoke on "Electricity and the Paper Industry," with slides showing charts which indicated the increase in the amount of electric power used today as against past periods, and showed the increased application of electricity to the paper and pulp industry.

A. M. Goodloe of the Midwest Air Filters Co. was to have spoken on "The Latest Development in Air Cleaning Equipment and Methods for Testing Its Efficiency," but he needed slides to explain his talk, and the man who had been operating the moving picture machine decided that his day's work was over, evidently, for he could not be found. Hence, this talk was omitted.

A. E. Armstrong of Armstrong Machine Works, spoke on "Armstrong Steam Traps and Their Application to the Paper Industry; The Efficient Drainage of Paper Machine Dryers," and illustrated his points with a section of an Armstrong Steam Trap, showing its value and application to the drainage system of a paper machine.

The last speaker was R. E. Wooley of the General Electric Company, whose subject was "Use of Electric Flow Meters in the Pulp and Paper Mill." He said that there are more flow meters used in the paper industry than in any other industry, and showed their value in measuring both steam and water in their various uses around a paper mill. He compared electrical and mechanical meters, giving slight preference to the electrical meter because of its possibilities for more convenient grouping, and explained the virtues of both sorts of meters.

The other speakers scheduled for the meeting failed to appear, and the meeting adjourned until next year.

Electrical Maintenance in Paper and Pulp Mills*

By H. L. HAYES

Electrical Engineer, St. Croix Paper Co., Woodland, Me.

MAINTENANCE is generally distinguished from ordinary repair work in that it includes the inspection of equipment and the making of minor repairs when work can be done with least loss of production, and it also takes into consideration prolonging the life of equipment which may otherwise be shortened by premature breakdowns. Several years ago a steam engineer stated that he had obtained a good position because, in his previous position, he had been fortunate enough to have had a large number of breakdowns and, due to this experience, had become particularly expert in making repairs. Stress was laid on the fact that the only way to learn about apparatus is to get it running after a breakdown. With the best of maintenance programs there will still be plenty of opportunities to get breakdown experience, but a good maintenance crew will avoid many times the making of extensive repairs.

Maintenance work can be carried to extremes, thereby being unduly expensive and yet not accomplish the desired results. To obtain a proper balance of values, maintenance work should be systematic.

Keeping of Records

The first requirement of systematic maintenance is the keeping of records. Some men, especially in the smaller mills, may be inclined to scoff at records as being unnecessary and only so much red tape, but there is reason to believe that all mills need practically the same information and should keep the same records, with possibly minor changes to suit local conditions. In the larger mills it may take all of the time of one or even several men, while in others it may only require part time of one man, but in all mills complete maintenance records should be kept.

This article deals with electrical equipment, especially motors and motor starters, but the idea can be applied to all apparatus.

Regardless of the kind of industry using them, motors have the same general characteristics, but as to the records there is a wide divergence in the information to keep and the manner of keeping it. There is generally a tendency to keep too much data on one form. On cards for motors, there is often kept not only the motor specifications, which are practically constant, but also variable data such as sizes of pulleys, fuses or overload settings, load readings, motor-starter rating, driven load, etc. All these variable data are subject to change every time a motor is moved to a new location with the result that a new card is necessary or the old one corrected. There should, therefore, be two cards for each piece of listed apparatus, one of which is called the "Specification" card and the other the "Maintenance and Service" card. The "Specification" card should contain the following data:

Data on Specification Card

1. Number as assigned by mill.
2. Where purchased with date and purchase price.
3. Where first installed, with date.
4. Complete name plate rating, including manufacturer's name.
5. Efficiency, power factor and heating guarantees.
6. Winding data, such as coil specifications, connections, number of coils, coil throw, etc.
7. Mechanical data, such as bearings, oil gages, oil rings, shaft sizes, etc.
8. Miscellaneous data for brushes, collector rings, etc., and space for general remarks.

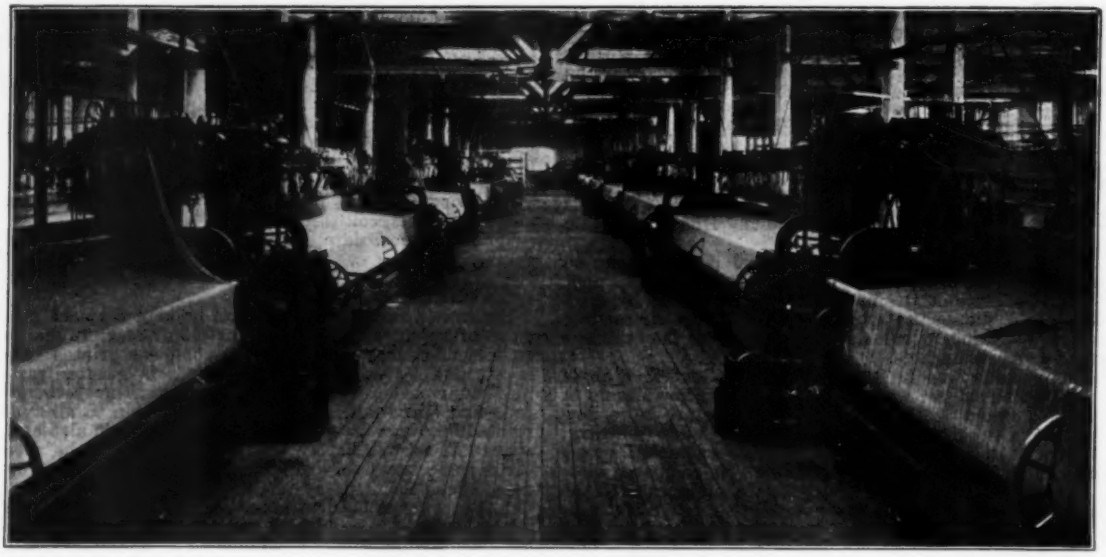
Separate specification cards can be kept for each individual piece of apparatus, but those for motor starters and general equipment cannot have quite the complete printed form that is possible for motors, because there is greater variety of individual parts. However, contacts, starting coils, overload coils and operating mechanism are common to all types and printed headings may be used, but there should also be a large space left for the listing of odd parts. It will be noted that the specification data are seldom subject to change and, therefore, should be kept by itself. Complete information about old apparatus is hard to obtain, and it is good policy when a repair part is ordered which has not been previously listed, to get the drawing or catalogue number from the invoice and put it on a specification card, as one object of this card is to have a convenient method of filing information for future reference. This usually requires considerable space, so cards or loose leaf sheets should be made large, some at least 12 by 14 inches.

Parts That Should Be Stocked

Good maintenance work requires that there should be stocked parts which are subject to wear or deterioration and are necessary for continued operation, but yet cannot be easily or quickly made in the local plant. Spare bearings are considered a necessity for important motors, but if ordered by motor numbers alone there would be considerable duplication as a slow speed motor of one size may take the same bearing as a high speed motor several times as large. There is the other condition where bearings are of the same general type and size but are not interchangeable due to different minor characteristics. It is therefore necessary to have specific information about each part which it is desired to stock. Spare windings and even spare motors are a necessity for continued operation but are difficult for many electrical departments to obtain. A spare winding is preferable to a spare motor when the latter is special or where there is only one of that particular type and speed, if, as it is frequently possible, that particular motor can be shut down for a time to be rewound, but could not remain down long enough to get a new winding from the factory. In such cases a spare winding requires less investment than a spare motor and may be nearly as effective, especially as many motors can be rewound in less than twenty-four hours. For other motors a spare winding is useless because there would not be time to wait for its installation and so spare motors must be provided. With belt drives spare motors are the cheaper proposition, because even if the spare is not of exact size and speed wanted it can generally be used, at least temporarily. It is with direct connected motors that special difficulty is encountered. In figuring out the need of either spare windings or spare motors, study each individual case; estimate the effect of a breakdown and then, if of sufficient importance, plan on having a spare motor or a (complete or part) spare winding as the case warrants. There is a sequence of operation, such that even a small breakdown may have disastrous consequences and the need of spare equipment is obvious if one is to secure the continuity of service so essential to a paper mill.

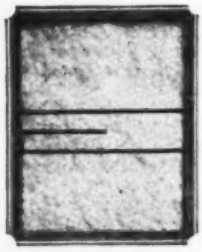
The efficiency and power factor guarantees listed in the specification form are important for making power tests of motors. From a depreciation point of view there is no economy in running underloaded motors because up to a certain temperature the insulation deteriorates practically as fast with low temperature as it does with high. Underloaded motors are a loss through increased investment, lower efficiency and lower power factor. Power measuring instruments are therefore necessary for a proper maintenance program. It frequently happens that a complete set of instruments can be paid for in a comparatively short time through detecting underloaded motors. For example, there may be a case where a 100 hp. motor is carrying a 75 hp. load and, when in need of a 100 hp. motor a 75 hp. motor can be purchased and the substitution made, thereby going a long way towards paying for the instruments. This is not an uncommon occurrence, be-

*Presented at the Annual Convention of the Technical Association of the Paper Industry, April 9, 1924, at New York City.



Main aisle in one of the weave rooms

Where Scientific Precision Has Replaced Guess Work



You will recognize Hamilton felts by two blue lines running the full width of the felt with one shorter blue line between them.

In such a process as the production of felts for paper mills absolute control of the processes, accurate to the last detail is essential to success.

Hamilton felts are made under such control. We know the precise contents of every solution; the exact degree of heat in every dryer; the nature of the fibre we are handling and the proportion of the mixtures.

This modern precision has come to the aid of a practical experience running back 66 years. It has made possible products like the Hamilton A plate felt—a boon to hundreds of paper makers.

The demand of paper makers for this felt has astonished us. Every month it grows noticeably greater—and once a mill has used A plate felts it keep ordering more!

Hamilton felts are made for every paper mill use.

Let our service men help with your felt troubles whether you are now using Hamiltons or not.

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Hamilton Felts

cause there is a tendency to play safe in recommending the motor sizes for machines.

Possibility of Going to Extremes

In these days of agitation for high efficiency there is, however, the possibility of going to extremes and sacrificing reliability for efficiency. Reliability of operation is of supreme importance because when a motor breaks down its efficiency is zero and even though its operating efficiency may be high it will be more than offset by a few breakdowns. With a constant load, motors may be loaded up to the safe operating temperature, but with variable load it is a more difficult matter. This may be illustrated by a pump taking a normal load of 75 hp., but for a few minutes at a time taking 100 hp. From a heating standpoint a 75 hp. motor would be sufficient, but the overload relays will have to be set at approximately 110 hp. to take care of the maximum load which is 47 per cent overload for the 75 hp. motor. This is too wide a margin for single rated motors and the extra investment for a 100 hp. motor would be offset by a new winding if the 75 hp. motor burnt out due to lack of proper overload protection, to say nothing of the loss of production. In some cases there would be a loss in efficiency and lower power factor in using the larger motor, but it is also frequently possible that the larger motor may be more efficient at the part load than the smaller motor at full load. There can be no set rule for the proper application of motors as each case really involves individual study to get unit as well as overall plant efficiency. There is, however, one important principle in the selection of apparatus from a maintenance point of view, and that is to standardize as much as possible, all things consjdered, on one manufacturer's line. When buying machines with which motors are to be supplied, it is good practice to specify that motors shall be supplied of same manufacture as are in general use around the plant, as this eliminates the carrying of extra parts and spare equipment.

The success of a maintenance program depends greatly on the men who are doing the actual work. We have on each shift a man whose duty it is to make periodic trips around to all the motors. Originally their idea was apparently to make as many trips as possible, looking over motors for any evident trouble, but their responsibility ceased if motors were running satisfactorily at the time. This attitude has been changed as they are now responsible for things that might happen which are within their power to prevent, as we depend on protecting motors from possible injury rather than on the chance that a motorman will happen to be on the spot when trouble occurs.

Causes of Motor Burnouts

The three principal causes of motor burnouts are, actual breakdown due to defective insulation, bearings burning out, permitting rotor to rub on stator, and overloads. A well constructed motor is inherently a reliable piece of apparatus and most of its troubles are due to outside causes and it is therefore evident that all conditions affecting a motor should be considered.

In many locations it is practically impossible to keep motor windings clean, but ordinary dry dust does not necessarily injure winding, except by plugging the air ducts, thereby reducing motor capacity. Oil, water and acid are, however, particularly undesirable and every effort should be made to prevent them from getting on windings. Oil is watched not only as to its coming from motor bearings, but it is liable to be thrown into the motor from belts, chains or gears. Pipes near motors must be watched for leaks; even if they are not where water or acid may directly strike the motor, they can do harm by the liquid striking the floor and spattering into it. Keeping motor windings in proper condition eliminates to a great extent this first source of trouble. Ordinary blowing out with compressed air is not sufficient, so besides cleaning, they should be painted with a good insulating varnish. Under ordinary service conditions motors should be completely taken apart at least every three to five years and if conditions are severe the interval should even be shortened to once a year. Some motors are difficult and expensive to disassemble, especially if in constant service, so when frequent painting is ncessary the ends of coils can be painted using an air-gun at 20 to 25 lb. pressure. This gives quite effective results and the complete overhauling can be done at longer intervals. In paper mills there is always the danger of a motor getting flooded with stock or water and the painting of windings, by filling up pores and minute cracks in insulation, often prevents breakdowns from these causes. The air-gun is particularly useful because it enables the varnish to be sprayed between coils, and the whole exposed surface coated over.

Avoiding Bearing Troubles

Bearing troubles due to their own conditions are infrequent if kept properly filled with oil and free from grit, but may be caused by tight belts or crowding of shafting, and pump rotors. It is expected that whenever millwrights take up a belt, connected to a motor, the motormen will be notified so that they can watch the bearings for any undue heating. Bearing oil should be changed at definite intervals, at least once a year.

Overloads generally come from outside causes except when the motor runs single phase due to defective circuit connections. Proper overload protection will take care of overloaded conditions, and motormen are expected to check the operation of the overload relays frequently. There is a tendency when a motor is overloaded and blows fuses or frequently trips overload relays "to set 'em up higher" and take a chance, but this should only be done in emergency or under special conditions which warrant taking the chance, otherwise install a proper sized motor.

Motormen act as inspectors and do minor emergency repair work, but the greater part of the repair and inside inspection work is done by a regular repair crew. Whenever there is more than a one-man crew, it pays to have certain work followed as much as possible by certain men who, by continued practice, will gain extra proficiency in their particular line. Inspection and repair work require men who can see beyond just the obvious things.

Chart System of Motor Inspection

Before we had systematic inspector motor starters gave trouble and were a source of annoyance and expense, especially if it occurred during the night shifts and had to be fixed by the motormen. Their work would be more or less hurried and not done well so that starters would frequently again give trouble; we therefore had the vicious circle of a trouble hurriedly fixed, causing more trouble. To overcome this a chart or card system of motor and starter inspection was developed. Every other week was assigned for Motor Starter Inspections and certain men detailed to do this work. In deciding how often inspection was needed it was assumed that a starter, under ordinary service, should stand up at least for one year when started twice a day for 300 days or 600 times. With this as a basis it was estimated how many times each starter was expected to operate, and that number of times divided by the 600 is the number of times a year the starter is to be inspected. This is used only as a basis and is not strictly followed because some motors are only started once a week, which would be 52 times a year, but it was considered that any starter could afford at least one inspection a year. On the other hand, there are motors started a large number of times, even to 300 or 400 times a day. These gave considerable trouble when ordinary hand starters, but with the magnetic switch type have given practically none. There seems to be a growing tendency to use a magnetic or remote control starters and eventually they will be nearly universally used, as they eliminate to a great extent the personal element in starting, as improperly started motors are a considerable source of trouble. Acid plants, blow pit rooms and such places offer an opportunity to put magnetic types of starters in a room by themselves out of reach of acid fumes, dust, etc. Our principal trouble with the magnetic type of starter has been when someone "takes a swipe" at the push button with a pickaroon instead of using the hand to start and stop a motor.

Forms for Inspectors to Follow

Inspections include not only the contacts but the complete equipment, and in making inspections we have found it advisable to have forms for the inspector to follow. These eliminate any tendency to slight certain parts as it is required to check each part as being O. K. or otherwise.

It not only aids the inspector but after the desired information has been noted in the service record, inspection forms are sent to the motormen who are are not very keen on having an inspector report things that they have overlooked.

On alternate weeks the general apparatus around the plant is inspected, such as station apparatus, transformers, etc. Previous to scheduling the inspection work it was customary to bring a large crew in each Sunday and the work was more or less haphazard. Some apparatus got too much attention and others were neglected altogether.

The service records show the results of inspection and overhauling. If it is found that between inspections apparatus gives trouble, their frequency is increased and vice-versa if generally found to be satisfactory. The keeping of minor records as fuses blowing and overloading relays tripping has enabled single phase running to be detected, as well as faults in the machines driven. When available we put down the name of the man who started the motor if it gives trouble by blowing fuses due to improper starting, especially as may happen in "jogging" to run on belts, etc. Continued trouble along that line enables us either to caution the man or to

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instruct him in the proper manner of handling starters. It is not uncommon to find men with the idea that they are helping a starter by operating it slowly.

When a motor is purchased the service record starts with a number and rating. When installed, the date, location and machine driven is recorded, ampere and voltage readings are taken, also air gap, pulley size, belt data and overload protection setting. Routine cleaning is not recorded but all inspections, overload tripping, and overhaulings are noted. It sometimes happens that when installed certain overload settings are made and later inspection reports show them changed. The service record is a check on what the original setting was so that there cannot be changes of adjustment without being detected. Service data is never destroyed because if a motor is changed to a new location a note is made to that effect and the record continued. It is not a difficult or time-consuming record to keep, because many motors give practically no trouble and only two or three entries may be made during a year's time.

Keeping the Work from Becoming Congested

We have found it a decided advantage to schedule inspection as it tends to keep the work from becoming congested. We have also found it an advantage to furnish simple written instructions on the care of apparatus. Many men find it difficult to apply themselves to a regular course of study, but will read instruction sheets and bulletins supplied by the local plant or by the apparatus manufacturers, as apparently they wish to get to the point quickly about apparatus in which they are interested.

Paper mills with electric motor driven grinders, electric steam boilers and electric motor paper machine drives are fast becoming entirely dependent on electric power for their operation. One can read articles here and there about electrical maintenance work, but practice seems to vary so much that, considering its importance, it would seem to be within the province of this Association to obtain data to more or less standardize record forms, and give recommendations as to proper upkeep of equipment.

Drying and Conditioning Gummed Paper*

By J. O. ROSS

President J. O. Ross Eng. Corp., New York City

DISCUSSING the proper kind of gummed paper drier is very much like discussing the proper type of house that a man should build.

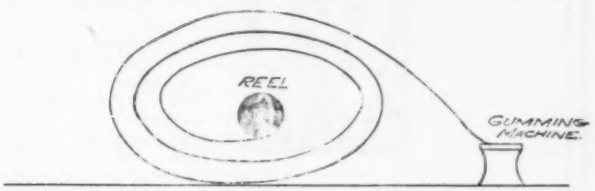
Nearly every gummed paper manufacturer has his own ideas as to how the drier should be built and even has his own ideas as to the results that should be accomplished. There is probably no branch of the paper industry where there has been so little standardization as in the drying. Usually each man believes that his own particular drier is the best, although we encountered two cases where each man thought that the other man's system was better than his own. We suggested that they swap driers and find out the flaws in the other system at first-hand. I fully expect that many gummed paper men are going to disagree with many things in this paper. I feel that no one is in a position to say just what system should be used and can only present some of the different types and some of their advantages and disadvantages and depend on a discussion among the various interested parties to establish some sort of common ground.

Two Classes of Gummed Paper Driers

In general gummed paper driers are of two different classes. First the driers which hold the paper under tension, and second those which dry the paper without tension. Perhaps the best known type of the first class is the so-called "Crowell Drier." This consists of a machine which takes the paper through the gumming machine and carries it over a spiral finally winding up in the center of the spiral somewhat as shown on the sketch. The entire Crowell machine is enclosed and the paper is dried by hot air directed on the surface of the sheet. The enclosure prevents the heat escaping into the work room and keeps it in contact with the sheet. There are many adaptations of the Crowell machine. In some cases the paper is carried over a large drum instead of a scroll. This drum may be enclosed, with steam admitted in the interior operating very much like a paper machine drier and the heat is transmitted through the paper to dry the gum on the surface. This is improved by blowing a blast of hot air on the gummed surface so that all the heat for evaporating the moisture does not have to go through the sheet. This works fairly well if speeds are maintained constant, if the gumming mixture is always the same, if there are no stops and if the paper must not dry too much. However, it is a good deal like passing a wet surface through a flame. If it passes through rapidly enough no injury results due to the cooling effect by the evaporation of the moisture. If the material is stopped, however, and becomes dry it immediately burns up. In general this cylinder method has not been very satisfactory.

A better scheme is to use a skeleton wheel or slatted drum, carry the paper around the circumference of it and blow hot air on the outside of the gummed surface. Hot air is also often introduced inside the wheel so as to raise the temperature of the paper which assists the drying. In some cases two drums are used, the paper passing first over one then over an idler roll and finally over the second drum in such a way that the gummed surface is outside.

Another system of drying where the paper is carried under tension is to carry it through a flat after leaving the gumming machine being carried either on a belt or on rollers. In this there is usually a combination of heating methods. Hot air is blown in at one end of the enclosed drier and taken out at the other and in addition to this steam coils are placed above the gummed surface so that the radiated heat and also the radiant heat helps to dry the gum.



CROWELL DRYER

TENSION DRYER

The machines so far described operate with the paper under tension, that is they hold the sheet and in that way prevent undue curling of the paper, which is one of the very serious difficulties in drying gummed paper. Gummed paper will curl on the edges to an extent never encountered in coated paper or wall paper. If a sheet of paper is gummed and laid on a flat table, in an ordinary atmosphere it will often curl so much as to form a tube. This tendency has led to installing drum driers or roller driers crowned in the middle so that the paper passes through the drier in an arched form which has a tendency to stop the edges curling. Other means have been tried of wetting the underside of the sheet on the edges so that the edge of the paper is wet not only where the gum is applied but on the underside so that the shrinkage of the two sides is more nearly the same, eliminating part of the curling. The great trouble with all means of carrying the paper under tension is the very short time allowed for drying.

The Factors of Time and Heat

To dry a piece of gummed paper, two elements enter. The first is the time allowed for drying, and the second is the amount of heat for drying air that must be supplied. It will be very evident that the shorter the time allowed for drying, the greater the temperature and the more air that must be used. This brings in a complication. If a sheet of gummed paper is put through too high a temperature it has an injurious effect on the gum after it has reached a certain stage in the drying process very much like a sheet of coated paper, which can be subjected to a considerable degree of heat when the paper is wet. This is done in the case of double coaters by using a very high temperature on the floater. No injurious effect is caused due to the cooling effect produced by evaporation. When the paper has been more than half dried, this high temperature is decidedly objectionable owing to the danger of overdrying. It is impossible to design or regulate a high temperature drier that will dry paper very rapidly until it reaches the proper percentage of moisture and which will stop at that desired point.

All paper contains a fixed percentage of moisture which is dependent entirely on the condition of the atmosphere surrounding the paper. If the paper is exposed to a low temperature and high humidity it will continue to contain a high percentage of moisture and will contain that regardless of how long it is exposed to this atmosphere. If the atmosphere is raised in temperature or decreased in humidity the paper will immediately dry out until it again reaches a balance, dependent entirely on the temperature and humidity of the surrounding air. It will then stay at that point until the atmosphere is again changed to a higher temperature and lower

*Presented at the Annual Convention of the Technical Association of the Paper Industry, April 10, 1924, at New York City.

BOARD DRYING

WE HAVE just published an illustrated bulletin describing the many uses of the COE AUTOMATIC ROLLER DRYER for drying thick paper or composition boards, from 1-16 inch to 1 inch thick, such as BINDERS BOARD, LEATHER BOARD, FIBRE WALL BOARD, INSULATION, PLASTER WALL BOARD, and other products of wet machines, pasters, and presses.

This dryer is a continuous machine for rapid uniform drying of flat boards and while comparatively new to the industry is in successful use by several large firms with great economy and savings.

If you are not familiar with the continuous ROLLER DRYER it may pay you to become acquainted with its possibilities. We will be glad to send copies of this new bulletin to all parties interested in the subject of BOARD DRYING.

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moisture content in which case it will immediately dry out the paper again still further.

The Ideal Drying System

It will therefore be evident that the ideal drying system as far as quality is concerned would be to surround the paper with an atmosphere which would be exactly correct in temperature and humidity to produce paper containing the proper percentage of moisture. A temperature of 70 deg. F. and about 60 per cent humidity, which is usual in an ordinary office or warehouse, will produce paper with about 6 per cent moisture content. Therefore if this paper could be dried during the manufacture with a temperature of 70 deg. F. and 60 per cent it would gradually give up moisture until it reached 6 per cent and would never go below that point regardless of how long it remained in the drier.

The flaw in this kind of system would be that the paper would dry very slowly. When the paper reached 10 per cent moisture content it would become very slow drying and by the time it reached 7 per cent it would be so slow that it would probably take as long to drop from 7 to 6 per cent as it did to drop from 40 to 7 per cent. Therefore it is not practical to install a drying system of that kind. With a high temperature drier, however, which is necessary if paper is to be dried fast, it means that if the paper is allowed to remain in that atmosphere it will be practically bone dry. The more time that is given to the drying, the less risk there is of overdrying the sheet so that the time element, as it is called, has a very important bearing on the quality of the sheet.

All tension machines have this inherent defect. If gummed paper is being run through at a speed of 100 ft. per minute and carried over a steam drum 30 ft. in diameter, which would be out of the question, it would still have only 1 minute for drying. That is the reason that the Crowell drier uses the spiral. It operates about the same as if using a larger number of cylinders but instead of mounting them one after the other they mount them one inside the other so as to save space.

The drier which carries the paper through flat either on rollers or belts also has the same trouble. If we are to allow 1 minute for drying and wanted to run 100 ft. per minute, it would mean a drier 100 ft. long. Experiments have been made and some driers have been built to carry the paper back and forth several times so as to cut down the total length. It means that the wet side of the sheet must be in contact with rollers or belt somewhere and the gummed surface must be dried out sufficiently in one run through to avoid any injury to the surface. This very strictly limits the length of time that can be allowed for drying.

The Festoon System

The best method so far found of giving a long time element for drying is the so-called festoon system. This is very commonly used in drying coated. it means hanging the paper up in loops over sticks which are carried along on chains. The greatest advantage of the festoon system is the length of time that can be provided. It will be remembered

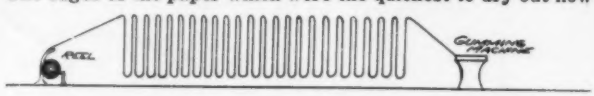
TENSION DRYER
STRAIGHT TYPE WALDRON DRYER

that a flat drier carrying the paper through horizontally 100 ft. long would only allow the paper 1 minute to dry if it was running at 100 ft. per minute. Now let us look at a festoon system under the same conditions. A festoon system 100 ft. long, if the sticks were placed on 8 in. centers would have 150 sticks in 100 ft. of drier length. If the paper had festoons 6 ft. deep there would be approximately 12½ ft. of paper to each loop and with 150 loops we would have approximately 1875 ft. of paper that would be hanging up in the drier only 100 ft. long. If this paper was running at 100 ft. a minute we would have 18¾ min. time for drying. This means that lower temperature, higher humidity and slower drying can be used, which would more nearly approach the ideal condition.

Gummed paper dried in festoons would not be in nearly so much danger of overdrying and it has been adopted by many gummed paper manufacturers. It will be seen at once that the paper is not under tension and that immediately raises the question as to the curling effect. Some companies in experimenting with festoon driers found that the paper curled so badly that it slowed down the reeling of the paper and in some cases means had to be provided for flattening out the sheet before going on to the reels. Part of this trouble it was found could be overcome by a different mixture of gum but regardless of this change there is undoubtedly more danger of curling the edges with a festoon system than with a tension machine.

Introducing Humidity

Experiments were then conducted with the idea of introducing humidity to the paper just before it goes on the reels and it was found that that stopped a great deal of the curling. The edges of the paper which were the quickest to dry out now



FESTOON DRYER
NO TENSION

became the quickest to absorb moisture and as the edge absorbed moisture the skin tension of the sheet was released with the result that the edges began to uncurl. This also gave an opportunity to incorporate the idea of having a fixed temperature and humidity to produce a fixed moisture content in the sheet and yet have quite rapid drying. The drier can be set for a temperature and humidity that would tend to overdry the sheet but at the very end of the process a different atmospheric condition can be applied to prevent the sheet overdrying and if it has already become overdry to put moisture back equal to what it should contain. This is the model festoon drier and presents many advantages.

Differences of Opinion

Experiments have been worked out for various combinations. It is surprising the difference of opinions that exists among the gummed paper manufacturers as to what really should be accomplished. One opinion is that as gummed paper passes through the gumming machine, a high temperature should be applied at once in order to set the coating. This temperature is much higher than should be carried through the complete drier and it is very important not to have curling start during this setting process. This has led to the opinion that the ideal system would be to run it under tension over a drum, blow a very hot blast of air on it and then when the gum is set form a festoon and finish the drying at a low temperature and fixed humidity. In this way the large percentage of the drying would be accomplished under the high temperature and the rest of the process would consist of a very slow even drying. That is one theory.

The other theory seems to be almost the opposite; that the paper should dry under atmospheric control so as to prevent the paper curling on the edges until the moisture is almost down to the desired point. It will be remembered in the previous discussion it was pointed out that if the proper final temperature and humidity were used the paper would dry out quite quickly at the beginning when it contained a large amount of moisture but would be very slow in getting down from 10 to 6 per cent moisture. This second theory therefore takes account of that. The paper is put through air conditioning driers which gives a mild drying effect, keeps the paper from curling and dries it down to about 10 per cent moisture content. This is not low enough moisture content for the requirements and the paper is then put over a drum and dried down quickly to the required amount and at the same time held under tension so that it will not curl. It is recognized that if the machine should stop, the paper on the drum will probably be spoiled but the amount of paper carried on a comparatively small drum is very small compared to the amount of paper in the whole drier and with the advantage of the even drying, the mild conditions and the elimination of the curl, compensates for the small amount of waste that might be on the drum.

This has led to two almost opposite systems. One is to put in a system running over a hot drum first and then on to a festoon. The other is to go over a festoon first and then over a drum.

There is perhaps nothing that will show the widely varying difference in the gummed paper industry more than these two theories of drying and a discussion among the gummed paper manufacturers as to which of these two systems is correct, assuming that either is correct, would bring out the greatest difference of opinion that any question possibly can.

There seems to be quite a difference whether animal glue, fish glue, or dextrine is used and when gummed paper driers are being considered local conditions must be taken into account.

I believe the festoon drier offers a great many advantages but it is a serious step for any mill to change over from a tension drier to the festoon drier. Paper which has run perfectly satisfactory on the tension drier will be found to give

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trouble on the festoons. Conversely if a mill has been operating festoon driers and should change from a tension machine they are apt to be very much discouraged over the lack of drying time and the very high temperature that is required.

Methods in Use for Disposal of Lime Sludge in Sulphate Pulp Mills*

By G. K. SPENCE

New York and Pennsylvania Co., Johnsonburg, Pa.

FOR some years past soda and sulphate pulp manufacturers have been confronted with the problem of disposal of lime sludge from the causticizing process. When compelled to discontinue dumping the lime sludge into the streams many were forced to take hurried steps to dispose of it. The first step was to pump the sludge to large sedimentation basins, which were open fields banked up on all sides, in which the lime was permitted to settle and the clear solution from the top passed to the stream. This was an expensive means of disposal, especially where ground was scarce, as one can readily understand how soon these basins would fill up and necessitate raising the walls or increasing the area of ground covered.

With the advent of filter presses for washing the soda from the sludges, and thus increase the capacity of the alkali-room, and decrease the loss of soda, the pulp manufacturer was attracted to other methods for disposing of the lime sludge.

The lime cake from the filter press contains from 40 to 50 per cent water, and the most natural conclusion is that it is in proper condition to be readily dried and marketed for agricultural purposes. A number of manufacturers installed rotary driers, using coke as fuel, dried this lime, put it up in bags and marketed it under the name of precipitated or agricultural lime. The market for agricultural lime is seasonal and there are times when it is impossible to dispose of it, and the manufacturer is compelled to revert to his old method of disposal.

Even when the market will absorb the agricultural lime it is about a break-even proposition, and if it is necessary to store any, it is always rehandled at a loss.

Knowing that whiting would bring a higher price than agricultural lime some manufacturers made the necessary installation to produce this commodity from reclaimed lime sludge. As the trade requires a very clean product, free from caustic alkali, and of an extremely fine state of subdivision, it requires an elaborate installation to produce material which will meet the requirements.

Lime sludge from the causticizing operation contains about 8 per cent unspent lime or calcium hydrate and it is necessary to carbonate this which was usually done in CO_2 towers, and even then it was a difficult matter to keep the caustic alkalinity under 5 per cent.

The lime after passing through the driers was ground and bolted or air-floated in order to bring it to the required state of subdivision. There is only a differential of about $4 per ton between the selling price of agricultural lime and whiting, which difference is mostly absorbed by the overhead on extra installation, extra labor, etc., necessary to prepare the material to meet the requirements of the trade.

The whiting market is also very uncertain and as in the case of agricultural lime, the manufacturer is compelled at times to resort to the sedimentation method of disposal or if allowable, pass the sludge to the stream, until the market is again ready to absorb the whiting.

When confronted with the problem of finding a steady market for disposal of agricultural lime or whiting, the manufacturer was compelled to investigate the practicability of reburning the lime sludge and using the reclaimed caustic lime to causticize soda in his own process. Those who have studied this problem are unanimous in their conclusion that reburning is the most feasible method of disposal. By this installation the manufacturer can realize a greater return on his investment and at the same time furnish his own stable market for disposal of the reburned lime, which he uses right over again in his own operating system. In fact this method of disposal has appealed so strongly to the pulp manufacturers that, regardless of the large amount of money invested in agricultural lime and whiting plants, almost every one has been junked, and conversion made into installations for reburning lime.

The writer has had experience with all three systems and in order to familiarize those interested in lime sludge disposal with steps taken a rough outline of each is here given:

*Presented at the Annual Convention of the Technical Association of the Paper Industry, April 9, 1924, at New York City.

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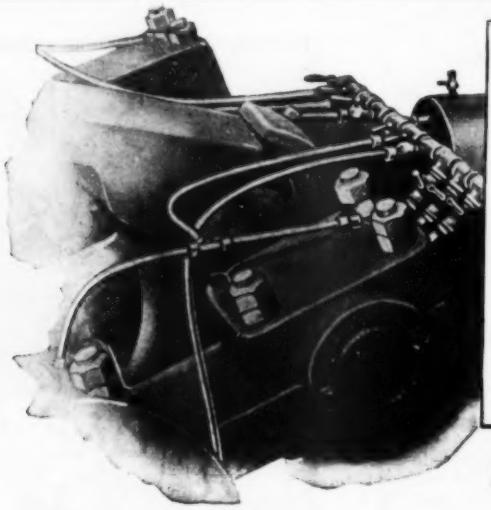

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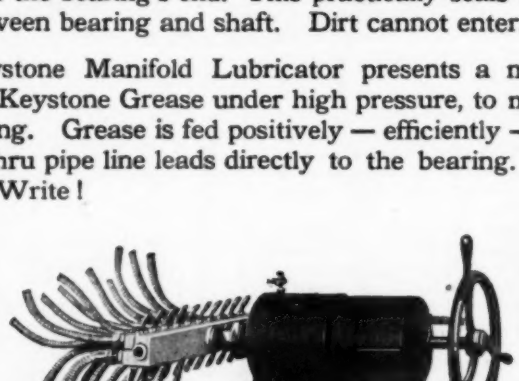

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Agricultural Lime

No extra care is necessary in preparing the lime sludge before passing same to the agitated receiving tank for the filter press. Either the continuous or batch type filter press may be used when washing the lime sludge, but care should be exercised to see that the soda is well washed from the cake before discharging it from the press. This can be better controlled by use of the batch filter.

The cake discharged from the press is passed through a rotary dryer 32 ft. long by 4½ ft. in diameter, the heat being furnished by burning coke, producer gas, or natural gas in the fire box. The dried lime is discharged into a larger dust chamber at the back of the rotary dryer, and carried by a screw conveyor to the bucket elevator, by means, of which it is discharged into the hopper supplying the bagging machine. Draught on the rotary drier is induced by means of a fan, and the air containing some fine dust is forced through a dry dust-collector, and thence through a stack provided with sprays to prevent fine dust from passing to the atmosphere. In some mills a special dust collecting device, such as the Dracco, Clark or Sly is installed. An Urschel-Bates valve bag packer is usually employed to pack the material for market. Following is a rough estimate of the installation cost, and daily operating cost of a plant for the manufacture of 50 tons of agricultural lime per day.

Installation cost, $65,000.	Daily operating cost
Interest and depreciation, 15% (325 days)	$ 30
Fuel for drying (coke)	70
Power	17
Labor	80
Valve bags	100
Repairs and office	25
	$322

Production cost per ton $6.44.

Agricultural lime will sell for about $7.50 per ton f.o.b. mill, but as it is necessary to pay 50c to $1.00 per ton to a fertilizer company for marketing the lime the margin of profit is very small, provided the market would absorb the lime as fast as it is manufactured, but as it is seasonal and unsteady at all times, it requires more or less storage and rehandling means a loss.

Whiting

In order to prepare the sludges for whiting it is necessary to remove all traces of black ash, and to carbonate all of the caustic lime before sending it to the filter press. The caustic alkalinity is usually removed by passing the sludge through CO_2 towers, the CO_2 being produced by burning limestone.

When manufacturing whiting it is next to impossible to obtain satisfactory results by use of continuous filters. The composition of the whiting must be controlled so closely that in order to procure the desired results it is advisable to use batch filters. Care must be exercised in passing the pressed cake to the rotary driers, as the feed must be uniform in order to insure proper drying results. It is a more expensive operation to dry whiting than agricultural lime. It must be dried either with indirect heat or natural gas. Any other means of drying tends to darken the finished product. The temperature must also be controlled very closely in order to completely dry and at the same time prevent burning some of the product to the oxide.

The equipment for inducing the draught and removal of dust from the escaping gases is practically the same as when manufacturing agricultural lime.

After passing the rotary drier it is necessary to grind the whiting and bolt it through a 200 mesh cloth, or grind and airfloat it in order to bring the product to the desired state of subdivision. This requires extra equipment and labor. It is necessary to have two forms of packers in order to comply with trade requirements; one being the open mouth bag packer for cloth bags, and the other the Urschel-Bates valve bag packer for paper bags.

Following is a rough estimate of installation cost and daily operating cost when manufacturing 50 tons of whiting per day.

Installation cost, $120,000.	Daily operating cost
Interest and depreciation, 15% (325 days)	$56.00
Fuel for drying (natural gas)	100
Power	30
Labor	135
Valve bags	100
Repairs and office	35
	$456

Production cost per ton $9.12.

The selling price of whiting varies from $11.50 to $12.00

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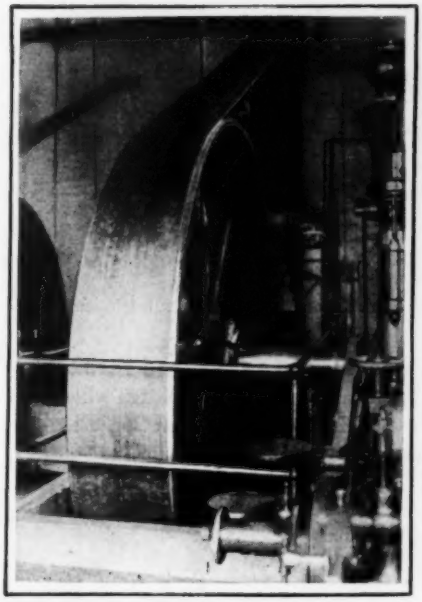

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Out in the Middle West the manager of a large mill after making several severe tests with different sorts of belts decided to rebelt his entire mill with leather. Among the leather belts that were used for making the tests were some members of the Graton and Knight Standardized Series.

The Graton and Knight Belts stood the tests so much better than any of their competitors that they were chosen for the job.

And this is what the manager of the mill* wrote us some years later:

"Some of your belts have been running for several years and as they are in as good condition as when they were installed we are unable to give you any opinion as to the length of service we will get out of them, but at this time we are convinced that they have paid for themselves several times."

Send for the book "The Standardization of Belting," and at the same time let us know the type of power transmission you are most interested in. This book tells how, through constant study and analyzation of transmission problems, we have developed a series of belts to meet every condition.

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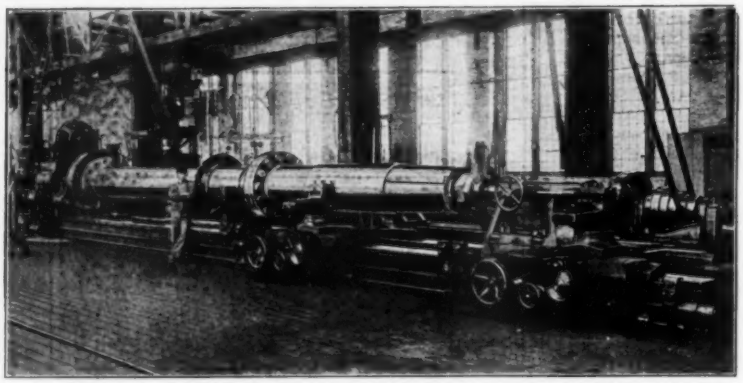

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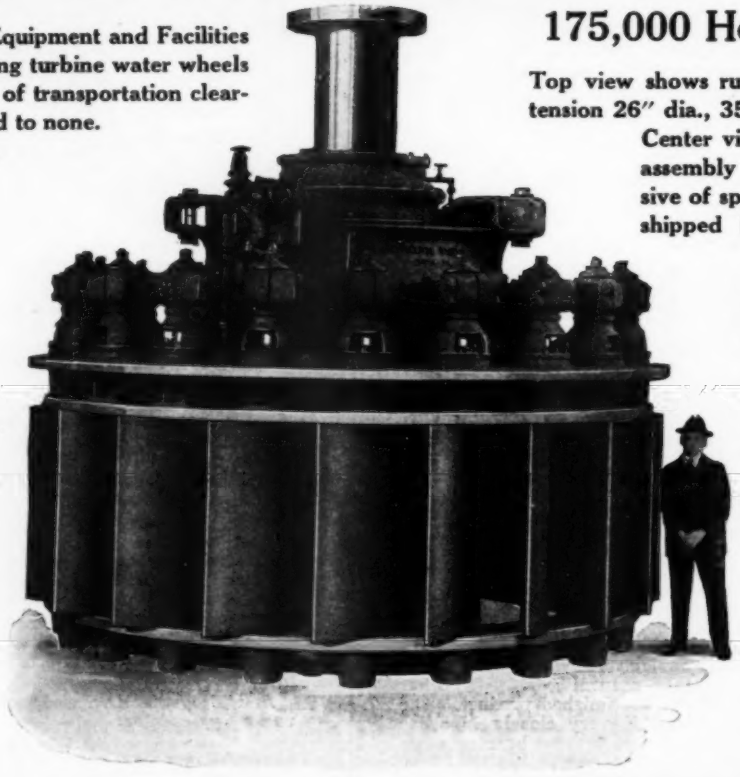
Shown in accompanying shop assembly and construction views comprising seven units built on one contract develop a total of

175,000 Horse Power

Machine Tool Equipment and Facilities for manufacturing turbine water wheels up to the limits of transportation clearances are second to none.

Top view shows runner shaft and extension 26″ dia., 35′ 0″ long in lathe. Center view shows complete assembly of one unit, exclusive of speed ring which was shipped in advance to be built into concrete spiral. Lower view shows five of seven solid cast runners, each weighing about 40 tons.



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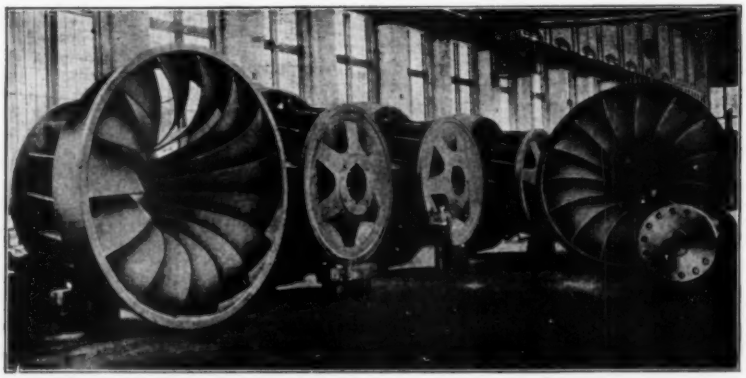


S. MORGAN SMITH CO. **York, Pa.**

per ton f.o.b. mill, but as it is necessary to pay a commission of 10 per cent for marketing the commodity, the manufacturer receives about $10.50 per ton for whiting when the marketing will absorb it as fast as it is produced. This will leave a profit of a little less than $1.50 per ton, if it is not necessary to re-handle the whiting; but if it is necessary to haul it to a warehouse, store and rehandle it when the market will absorb it, the necessary expense of rehandling will almost balance the margin of profit.

A lime reburning plant using producer gas for heat supply, is a slightly more expensive installation, but the return on the investment is so much more satisfactory, that it requires very little investigation to decide in favor of this equipment.

There is no previous treatment of the sludge necessary, it being pumped direct from the alkali room to the supply tank for the press. A continuous filter should be used, as it requires less attention and uniformly washed material is not essential.

The cake from the filter is discharged into the rotary furnace, which is from 100 to 120 ft. in length and 7 ft. in diameter, lined with fire brick. Producer gas is burned in the fire box.

In this process the burned lime is discharged at the fire box end of the rotary, while in the other two processes the dried lime is discharged at the opposite end.

The burned lime is either discharged into cars and hauled by hand to the alkali room, or conveyed to a causticizing tank in the lime burning room, where the carbonate liquor is causticized and pumped to settling tanks in the alkali room.

Following is a rough estimate of installation cost and daily operating cost of a plant for reburning 35 tons of lime per day:

	Daily operating cost
Cost of installation, $130,000.	
Interest and depeciation, 15% (325 days)	$ 60.00
Coal for gas producer	87.50
Power	22.00
Labor	50.00
Repairs and office	15.00
	$234.50

Reclaiming cost per ton $6.70.

This estimate is based on coal at $5 per ton at the plant, and burning two tons of lime per ton of coal. With this installation it is possible to reclaim 85 to 90 per cent of the lime used.

Powdered coal has been tried for furnishing the heat required for reburning the lime, and while this method will increase the burning efficiency, there is not the necessary data at hand to determine whether the accumulation of dirt in the lime from the ash in the coal is of sufficient detriment to condemn its use.

A pulp manufacturer, who is paying more than $8 per ton for his lime at the mill, and not over $5 per ton for coal, will show a nice profit from an installation for reburning lime for his own use, and at the same time discontinue the practice of discharging the lime sludge into the stream.

Continuous Causticizing Plant of Penobscot Chemical Fibre Co., Great Works, Me.*

By W. D. MOUNT

Consulting Mech. and Chem. Engineer, Lynchburg, Va.

BEFORE describing the new causticizing plant at the mill of the Penobscot Chemical Fibre Company, Great Works, Maine, I think it necessary that brief mention be made of one basic factor underlying any continuous process of causticizing, and on which success must be predicated; namely thorough agitation and boiling.

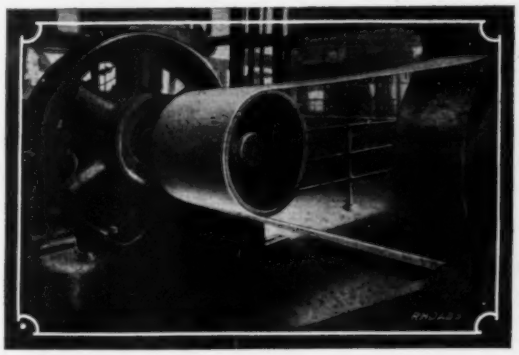
It has been my experience during a period of twenty-five years' active connection with the manufacturing and technical end of the alkali industry, and from what I have seen of operations in many plants, that with scarcely an exception the weakest link in the batch process is defective agitation and insufficient boiling. Mechanical agitation by means of equipment more or less standardized and common to the great majority of batch operations can lay no claim to 100 per cent efficiency—if by efficiency it is understood that we mean the thorough mixing and agitation of the contents of tanks varying in size from 10 to 13 or more feet in diameter, and as many in depth.

Advantages of Continuous Process

A mere enumeration of the advantages of a continuous process such as that installed at Great Works clearly indicates

*Presented at the Annual Convention of the Technical Association of the Paper Industry, April 9, 1924, at New York City.

RHOADS
WATERSHED TANNATE



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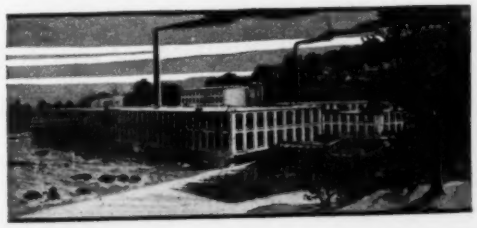

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by inference the disadvantages of the batch process displaced. These advantages are as follows:

1. The general advantages characteristic of a continuous method of carrying on any chemical process as compared to an intermittent or batch method of conducting the same process.
2. The continuous process, including a complete line recovery plant requires less than two-thirds of the floor space required by a batch system of causticization of equal capacity but without lime recovery.
3. A marked reduction in the amount of piping and fittings needed and the entire elimination of the familiar battery of causticizing and settling tanks.
4. A reduction of alkali loss in causticizing to a uniform level of less than one-half of one per cent.
5. A reduction in steam consumed to approximately 25 per cent of that normally required by the batch system; if exhaust steam at 10 pounds pressure is available, the use of live steam can be completely eliminated.
6. All apparatus and piping in sight and easily accessible.
7. Decreased cost of repairs and maintenance.
8. Uniform and positive chemical control of the process which tends to eliminate the factor of the personal equation which so often leads to ineffiicient operation.
9. A better place for the operatives to work, and a department which can easily be kept in a neat and orderly condition.

It must be distinctly understood that the claims which are made for continuous causticizing have not been based upon any one of these features alone. The advantages which I have mentioned are characteristic of the process as a whole and it has been demonstrated that they cannot be obtained in any other way than through the complete adoption of the continuous system. In other words, it would be impossible to change the batch system either in whole or in part and obtain the results which can be obtained with the continuous system.

Process One of Simplicity

The process is simplicity itself. There is no complicated apparatus or equipment to get out of order. Its maintenance does not add to the burdens of the superintendent nor does its operation require the attention of a corps of skilled chemists. Two men of average intelligence on each shift can handle the entire causticizing plant; if a lime recovery unit is connected with the causticizing operation, three men can look after both.

The special apparatus and equipment required for the process includes the causticizer, decanter, rotary filters, lime slaker, and certain auxiliary equipment such as vacuum pumps, lime and liquor pumps, etc. The causticizer, which is a tower formed of specially constructed rings, is supplied continuously with calcium hydrate and sodium carbonate in the proper proportions by means of pumps. A steady discharge of a mixture of caustic liquor and lime sludge is pumped from the bottom of the causticizer to the decanter whence the clear sodium hydrate flows from the top and the thickened sludge is drawn from the bottom. The operation of both causticizer and decanter is continuous yet the hydrate drawn from the decanter is clear. The sludge is pumped continuously to the filter where it is washed, and discarded, or reburned and reused for causticizing.

The following description of the Penobscot plant was prepared by my brother, J. E. Mount, who supervised the work of installation and the commencement of operations.

This plant was installed to replace a worn out batch system of causticizing, and at the same time effect various economies in operation which could not be obtained with the old system.

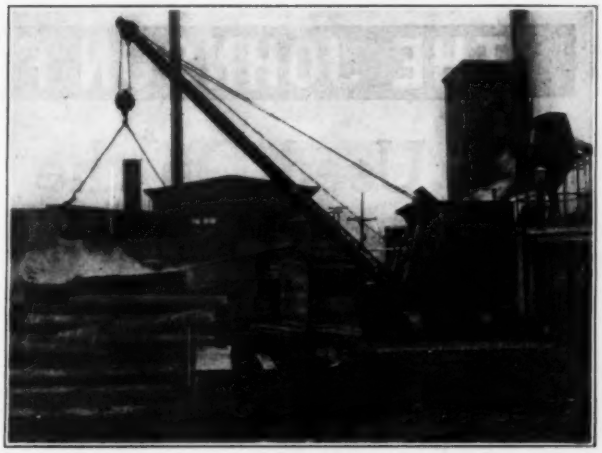
The apparatus consists of one causticizing tower, 6x34 ft., one decanter with a capacity of 40,041 gallons, two slaking pots for milk of lime, four continuous discharge rotary vacuum filters, 6x3 ft., and two duplex exhausters, together with such auxiliary apparatus as lime and liquor pumps, traps, etc.

The capacity required was to be sufficient to supply caustic liquor for a plant making 100 tons of soda pulp daily. The total floor space occupied by the plant as completed is 3750 sq. ft., or about one-fourth the space required by a plant of the same capacity making caustic by the old method. The saving in piping is fully as much as that in floor space.

Tandem-run Filters

The filters are so connected that two are run in tandem, the cake from the first being repulped with water and run over the second. This gives two separate filter units of such capacity that only one unit need be run at a time, the other being held in reserve. At present the cake from the secondary filter is discarded and washed away, but it can be easily used in a recovery plant should one be installed later.

In the operation of the plant, the lime to be used is first



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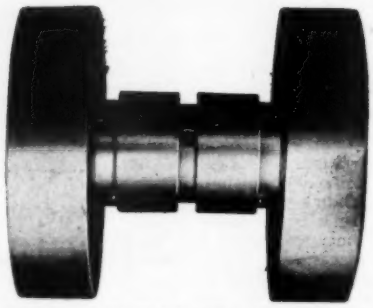
As Used On the Wesel Power Matrix Rolling Mills

The No. 5 Double Johnson Friction Clutch is the size used on this machine.



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Courtesy F. Wesel Mfg. Co., Brooklyn, N. Y.

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN

slaked in two slaking tanks. The milks of lime should contain from 150 to 200 g. p. l. CaO. When slaked in hot water it averages about 170 deg. fahr. in temperature. The liquid is pumped from the leach cells to two receiving tanks, and is pumped from each of these alternately and continuously to the causticizing tower. When the liquor, from one tank is being pumped to the causticizer the other is being filled from the leach cells. The average temperature of this liquor to the causticizer runs about 135 deg., fahr. From experience we have found that the strength at which the liquor should be held is about 40 deg. Twd., or 230 g.p.l. Na_2CO_2. This liquor is tested regularly and is held at as nearly a constant strength as practicable. The liquor is pumped into the top of the causticizing tower from whence it flows down around a series of mushrooms to the bottom.

Causticizing takes place in the lower third of the tower; the milk of lime is pumped into the third compartment from the bottom at which point it meets the descending carbonate liquor.

Steam and a small amount of air are admitted at the bottom of the tower and rise through the various sections agitating thoroughly the lime and liquor solutions. Before the steam reaches the top, it is completely condensed.

Pumping to the Decanter

The mixture of caustic liquor and lime sludge is pumped from the bottom of the tower to the decanter, where the sludge settles to the bottom and the clear caustic liquor rises to the top and flows off over a launder to the digester measuring tanks.

A control test is made on the discharged liquor from the causticizer every 15 min., and for the first one and one-half months of operation averaged 82.5 per cent causticity. The average temperature was about 205 deg. fahr. Once an hour the causticity of the decanter is determined. During the same period of operation, namely, one and one-half months, the average test of this liquor was 88.9 per cent causticity. The increase in causticity is explained by the fact that enough free CaO is usually discharged in the mixed liquor and lime sludge from the causticizer to raise the percentage of causticity in the decanter from 4 to 6 points over that from the causticizer, on the average. We did not attempt to obtain a causticity from the decanter of over 90.0 per cent. With regular operation there would have been no trouble in getting this up to 92.0 per cent by increasing the percentage of CaO in the causticizer. The average temperature of the decanted liquor was 140 deg. fahr.

We had no means of measuring the amount of steam used by the causticizer, but as all that was admitted to it was through a 2-inch valve one and a quarter turns open at a boiler pressure of 80 lbs., it was comparatively a small amount. I might mention here that the causticizer is completely lagged with magnesia blocks which in turn are covered with a steel jacket.

From Decanter to Primary Filter

The settled lime sludge is taken from the bottom of the decanter at an average temperature of 150 deg. fahr., and a consistency of 24.6 per cent solids, and pumped to the primary filter. After passing over this and the secondary filter, the average per cent of Na_2CO_3 in the cake for the first one and one-half months of operation was 0.95 per cent. During the last month, we brought this average down to 0.72 per cent Na_2CO_3, but as we had more or less trouble in getting a steady supply of wash water for the filters during most of the time, no trouble should be experienced in holding the alkali content in the cake below 0.5 per cent Na_2CO_3 when operating conditions become more settled.

The filtrate is pumped from the filters to the decanter where it mixes with the liquor from the causticizer. The average free CaO in the discarded cake from the filters was 3.66 per cent. The average moisture content of the cake was 38.8 per cent. The average vacuum carried was about 18 in. mercury. The moisture content can be decreased by raising the vacuum and by providing a better supply of hot water. The average thickness of the cake from the filter was about *one inch.*

We endeavored to carry the strength of the liquor from the decanter slightly above that required by the digesters, 8.0 per cent NaOH by weight, so that a small amount of doctoring with water could be allowed for each digester cook. The average amount of liquor decanted when running at full capacity, i.e., present capacity of plant, was about 103,056 gallons per diem. This liquor was clear and free from lime and carbon specks. The capacity can easily be doubled should need arise.

Considering the fact that the plant has been running only

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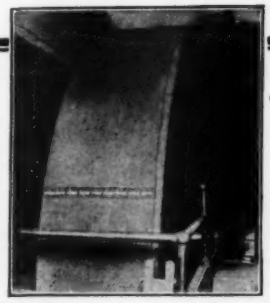

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Paper and Pulp Mills at Big Island and Coleman Falls, Va.

about two months, that a set of green operators had to be broken in, that necessary adjustments to machinery had to be made, and that operation has been more or less intermittent, the results accomplished approximate those sought for to a marked degree.

What Plant Has Demonstrated

The plant has clearly demonstrated the following benefits:
(1) It has brought about a much better place in which to work, with less piping and fewer pumps to look after.
(2) It will show marked economy in steam consumption which will be reflected in the coal pile.
(3) It has shown a large saving in alkali.
(4) The lime loss is no greater than before.
(5) The causticity is better.
(6) The liquor to the digesters is clearer and better settled.
(7) The lime is delivered from the filters in a form where recovery can be had.
(8) There is a saving in power and in maintenance.

Those benefits which the plant shows at present will each continue to increase as operating conditions improve and experience handling the apparatus is gained.

Turbines vs. Motor Generators*

By F. O. WHITE

Chief Engineer, St. Lawrence Paper Mills, Ltd., Three Rivers, Que.

IF A paper machine is to be equipped with a sectionalized electric drive, what type of prime mover should be installed to drive the special generator usually required? Should a steam engine, a steam turbine, or a motor be used?

The answer to these questions can be found only after a consideration of the amount of power required to drive the paper machine, the quantity of steam required to dry the paper, the cost of coal, the price of electric power and the installation costs. As between the steam engine and the steam turbine there is but little question as to the choice for the service. Economy of space, freedom from oil in the exhaust steam, and high speeds suitable for generator operation all make the turbine the more desirable prime mover even if its first cost should be higher.

The relative merits of a turbo generator and a motor generator are not so easily decided and it is the object of this paper to present a comparison based on operating records obtained in the plant with which the writer is connected.

This plant contains two 160 in. news print paper machines fitted with Harland sectionalized electric drives. The electric power required is supplied from direct current generators driven by steam turbines. Steam is delivered to the turbine at 200 lb. pressure with 200 deg. superheat and the exhaust steam is used in drying the paper.

The plant is fitted with steam regenerators between the turbines and the paper machines so that practically none of the exhaust steam is lost to the atmosphere.

As a result of several months' experience with the paper machines operating at 800 feet per minute, it has been found that:

1. Each paper machine requires an output from the genator of 5300 kw.-hr. per 24 hours corresponding to an average load of 221 kw. or about 300 hp.
2. Each turbine absorbs an average of 30,000,000 B.t.u. per 24 hours, which is about 7 per cent of the heat in the steam delivered to the turbine.
3. The quantity of steam passing through the turbine is about two-thirds of the amount required to dry the paper.

It is evident from these results that the heat absorbed in the turbine amounts to less than 5 per cent of the quantity required to dry the paper. This amount is so small comparatively that, if there were no turbines, the size of the steam boilers would be the same, the operating labor in the steam plant would be unchanged and the cost of repairs and supplies could not be reduced. Therefore, the only operating charges which can be made against the turbines are for the extra amount of coal, the repairs and supplies to the turbines themselves, and the interest and depreciation on the installation cost.

If it be assumed that coal having a heat value of 10,000 B.t.u. per pound is used and that the steam plant efficiency is 70 per cent it would require 4286 lbs. of coal to supply 30,000,000 B.t.u. to the turbine or 664 tons of coal per year of 310 days.

If a motor generator had been installed instead of the turbo generator, steam would be required for drying and

*Presented at the Annual Convention of the Technical Association of the Paper Industry, April 9, 1924, at New York City.

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(d) Handling lime mud in causticizing.

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heating only and it is probable that it would be generated at a lower pressure and with little or no superheat. The first cost of the steam boilers, then, would have been less and there would have been a further economy in the piping installation from the use of standard weight cast iron flanges and fittings in place of the extra heavy castings required with the higher temperature and pressure.

A careful estimate of these initial costs has been made, the result of which shows that in the particular plant under discussion the motor generator installation would have cost about $8,000 less per paper machine. The difference in annual expense for interest and depreciation may be taken, then,

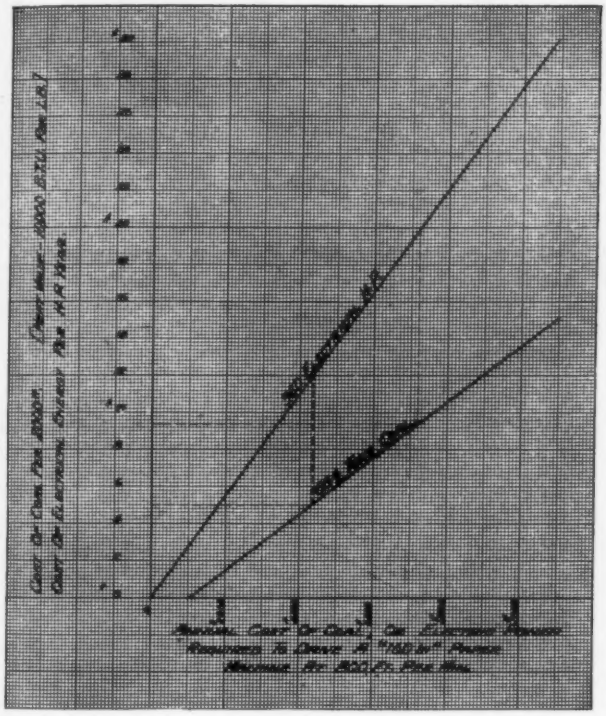

Fig. 1

to be $1,000. The cost of labor, repairs, supplies and other operating expense in either case would probably be about the same, at least the difference would be too small to have any appreciable effect on the comparison.

If an output of 300 hp. is required from the generator, the input to the driving motor, assuming the efficiency of the set to be 85 per cent, must be 355 hp. which is equivalent to say 360 hp. at the primary transformers.

The whole question, therefore, resolves itself into the determination of which can be obtained the cheaper, 664 tons of coal or 360 electrical hp., after making a deduction of $1,000 from the annual cost of the electrical energy.

The accompanying chart (Fig. 1) which is self-explanatory, has been made up to solve this question graphically for varying prices of coal and electric power. As these prices differ widely in different localities it is hardly possible to state definitely that one or the other of the prime movers is the more economical under all conditions, but, as indicated by the dotted lines on the chart, if coal can be obtained at a price equivalent to $5 per ton at 10,000 B.t.u. per lb. the cost of electric power cannot exceed $12 per hp. year if the costs are to be equal.

Similarly if electric power can be purchased for $20 per hp. year the equivalent price of coal may run up to $9.20 per ton. It is apparent, therefore, that under the present prices prevailing in most cases the turbo generator is likely to prove more economical than the motor generator, except in remote districts where water power is plentiful and cheap and coal is expensive.

John A. Frost, former traffic manager of the National Paper Products Co. of Carthage, N. Y., has been advanced to the position of sales manager of that company, to succeed J. J. C. Downey, who has resigned.

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Conveyor or Gravity Feed Shredder

THE operation of a beater, with its wear and tear and tremendous power consumption, has one primary purpose, namely, hydration. Anything that will economically bring about hydration more quickly relieves the beater just that much, cuts down on operating costs and speeds the process of paper making.

The Mitts & Merrill Shredder performs on magazines, books, old paper and boxboard, frozen or dried pulp laps, roll and sheet stock, in such a way as to greatly reduce their resistance to hydration when they reach the beater. It gives the beater an economical lift.

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We also build a 100% efficient "Hog" to reduce pulp mill bark and wood refuse.

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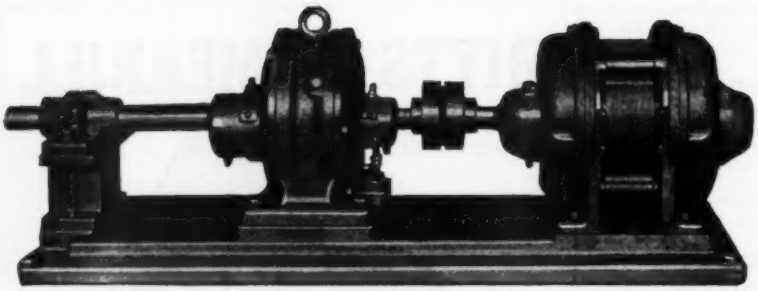

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D.O.JAMES

Canadian Section

UNDER the heading "Canada Should Bargain for U. S. Paper Market," the Financial Post of Toronto recently discussed the advisability of establishing an embargo on pulpwood from freehold lands.

It recalled that the development of the Canadian newsprint industry was coincident with the placing by the Pronvincial governments of Ontario, Quebec and New Brunswick of embargoes on pulpwood grown on crown lands in the respective provinces, on account of a considerable influx of American capital which established mills to supply the tremendously increasing demands of the American press.

It then showed that the other branches of the paper industry, and more particularly mills which manufactured pulp without converting it into paper, were far from enjoying the prosperity of the newsprint mills. A complete embargo would probably give the pulp mills and the paper mills manufacturing other grades than newsprint a prosperity commensurate with that of the newsprint mills.

But without going the length of prohibiting exports completely Canada could at lesat obtain very favorable conditions from the United States and demand removal of the existing duties on pulp and paper, thereby giving the Canadian mills at least a fair chance to compete with the American mills on a basis approaching equality.

Saguenay Petitioned for Bankruptcy

The Saguenay Pulp & Power Co. is having plenty of trouble, which the officers claim to be in a large measure due to their connection with the now defunct Becker organization of London, England.

The financial statement for the year ended December 31, 1923, showed better than that for the preceding year, the deficit being $183,826, as compared with $419,579 in 1922; but the position of the company and its subsidiaries, including the Chicoutimi Pulp Co., is by no means clear, and the exact course to be pursued has not yet been settled. The directors consider the position of the Saguenay Company as sound, but it is hampered by lack of working capital. It has no floating debts to the public. Some of the creditors of the Chicoutimi Company are pressing to the extent of taking action and judgments for the amount of their claims, which necessarily embarrasses the company.

A petition in bankruptcy has been presented against the company, and Eugène Trudel, D. B. Brodie, and Arthur Ross have been appointed interim receivers. The liquid assets are said to be fully sufficient to meet the floating liabilities, but cannot be collected in time to meet the demands of the creditors. The mill of the Bay Sulphite Company at Port Alfred, P. Q., another subsidiary of the Saguenay Company, is being offered for sale by the liquidators. It is expected that the Price Brothers interests will acquire some at least of the assets of the organization, probably the mill and limits of the Chicoutimi Pulp Company.

It has been reported that Price Brothers had offered $21,000,000 for the Saguenay pulp interests, including Bay Sulphite, which amount would cover the debts but leave nothing for the shareholders.

Elaborate Paper Exhibit at British Empire Exhibition

Outside of the various Canadian Government exhibits, that of the pulp and paper industry will be by far the largest and most elaborately designed of any in the Canadian Building at the British Empire Exhibition which will open at Wembley on the 23rd instant.

Twenty-nine of the largest producers and converters in Canada are participating in the production of the exhibits of the Canadian Pulp and Paper Association, which will show the whole course of Canadian spruce from the forest to the home, as printed and circulated newspapers. The main feature of the exhibit will be a complete model groundwood mill, with forest background, a running river with a waterfall, a boom of logs, with water conveying the logs and sticks to the mill, and townsite, railroad sidings and wharfs. The whole model is an exact replica of a typical Canadian pulp mill, and has been constructed by the Forest Products Laboratories staff.

Individual exhibits will consist of a number of booths arranged for by the leading Canadian pulp and paper companies. Some of them will be of particularly handsome design, illustrating the great number of uses to which wood pulp can be put, from news print to artificial silk and most artistic colored crepe papers, and even to rugs. A considerable section of the exhibits will be devoted to the news print industry, which is backbone of the Canadian pulp and paper business.

Montreal, P. Q., April 1, 1924.

Big Electric Development for St. Regis

The St. Regis Paper Cmpany of Canada, Ltd., has awarded a general contract in connection with a $100,000 hydro-electric power development at Godbout, P. Q., to the Canadian Comstock Company. The contract includes installation of water wheels, generators, penstock, transmission lines, pumps, motors and electrical distributors.

It is expected that by April 15 the power line from the Bare Point sub-station to the plant of the Great Lakes Paper Company at Fort William, Ont., will be up and ready for the transmission of electrical energy. With the exception of fifteen, all of the steel towers are now up, and the wire is strung. The footings are all in for the balance of the towers and the work is well in hand. It was anticipated that the work would not be completed until June 1st, but it is well ahead of schedule.

New Bill Favors Sulphate Mills

A bill of considerable interest to certain pulp and paper mills has recently been passed by the Quebec legislature. It amends the Towns Act of 1922 and provides that "Notwithstanding the dispositions of the first paragraph of section 18, when it is a matter of a pulp, paper or pulp and paper mill, the power of regulation is limited to the authorization or confirmation of the location of the establishment of such mills, which, however, remain subject to the control of the laws of public hygiene, and no one may prevent or limited the operation of such mills by means of injunction or other legal procedure, the recourse of all persons affected by such operations being limited to a claim for damages and interest. A by-law of a municipal council once adopted cannot be revoked." This means in effect that if the provincial health authorities do not complain the municipality cannot.

This measure is of considerable interest to sulphate mills, which are not relished by the public in general, and which are frequently menaced with injunction proceedings. There has repeatedly been talk of such proceedings being taken against Wayagamack at Three-Rivers, P. Q., and they were actually taken some time ago against Canada Paper which had to close their sulphate mill at Windsor Mills, P. Q.

Ideal Finishing Room at Howard Smith's Cornwall Mill

The Howard Smith Paper Mills have recently carried out several improvements to their plant at Cornwall and expect to have all the improvements completed within the next couple of weeks. An edition to Nos. 3 and 4 machine rooms was put on which will allow of the lengthening of the machines. A new machine shop has also been erected which is 120 feet long by 50 feet wide. The new finishing room is one of the most attractive and best arranged of any in Canada. It is 133 feet by 186 feet, three stories high, built of concrete and cased in brick. This provides for taking the cars into the shipping room, the railway siding going right into the interior. At Gaspé the company will soon have completed their wood plant and will handle about 25,000 cords of pulpwood and about 6,000,000 feet of lumber per year. All the conveyors and loaders are finished and a new wharf has been built. A new breakwater is also included in the work which is being carried out. The transportation of the wood will be done by boats which have been chartered for the coming season.

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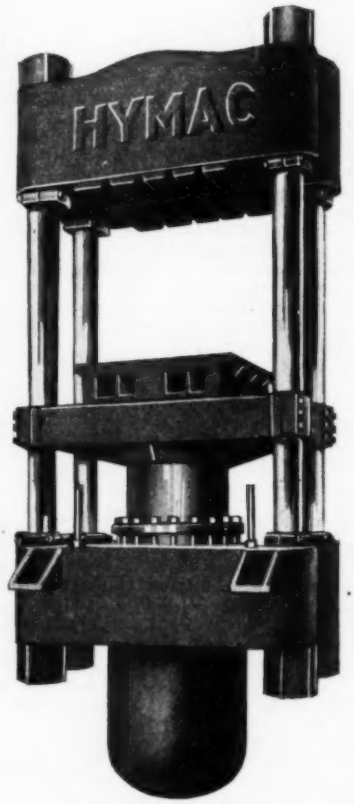

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WE build a large variety of PAPER BALING PRESSES in sizes and styles to suit purchasers' requirements—Hydraulic or Power driven—Our range of patterns is so large that practically any pressing surface, stroke and full opening can be promptly provided.

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MONTREAL, CANADA

Canadian Section

Nashwaak Increases Output

The Nashwaak Pulp & Paper Co., St. John, N. B., have completed changes and additions to their plants and they expect to have the second drying machine in operation very shortly, thus materially increasing the output. The mill is running at full capacity at the present time and no difficulty is being experienced in disposing of the production of bleached sulphite.

Despite reports to the contrary, W. L. Braun, works manager, will remain in charge of the St. John mill. Howard E. Beedy, vice-president and manager of the company, was given a hearty send-off by the members of the office staff and employees at St. John, being presented with a gold cigarette case and a silver loving cup, both appropriately engraved. He left for New York and will sail for Europe to investigate sulphite plants in European countries.

On his return to this side he will take over the position of assistant general manager of the Oxford Paper Company, of Rumford, Me., in addition to his present position. He will make his headquarters in New York, from which he will handle both operations.

Revise Electric Power Contract

The contract for hydro-electric power which will be supplied by the provincial government to the Great Lakes Paper Co., Fort William, Ont., whose pulp plant is nearing completion, has been revised. The company, which will be furnished with power at cost, will have to pay $21 per horse power instead of $18.

The reason advanced for the increase is the unfairness of the $18 rate for the Great Lakes Co. when the Port Arthur price is $21. The Nipigon Pulp Co. recently entered into a contract for power at Nipigon at $20. It is understood that assurances have been given the Great Lakes Co. that, when the Nipigon development is distributing its increased supplies, the power cost to the Great Lakes organization will drop to about $18.

Try to Amend Crown Timber Act

Acts to amend the Crown Timber Act and to license sawmills and pulp and paper mills recently were introduced into the Ontario legislature by Hon. James W. Lyons, Minister of Lands and Forests. The first measure places an embargo on the export of Ontario hardwood from the Dominion of Canada.

The other measure aims to obtain information respecting the amount of timber and pulpwood cut from both privately owned and crown lands, and also to obtain information respecting the amount of pulp and paper produced at each mill. The bill also controls the erection of sawmills as to fire hazards and aims to avoid disputes between two or more operators in booming the driving operations.

The Crown will also be able to check up against the returns made by operators.

Eddy Co. Closes Down for Repairs

Some 220 men were thrown out of employment at the beginning of March by the closing down of the sulphite plant of the E. B. Eddy Company at Hull, P. Q. The reason for the shutdown is that the company is going to replace the present equipment, some of which has been in continuous use for over thirty-six years, with more modern and up-to-date equipment.

It had become impossible for the company to manufacture sulphite as cheaply as it could buy it, for the plant had become antiquated, and it was therefore decided to scrap the old plant and replace it with an entirely new one. It is estimated that this will require at least six months.

Raise Dam to Obtain More Power

The Powell River Lumber Company, Powell River, B. C., preparatory to increasing their manufacturing facilities for turning out more newsprint, have completed plans for increasing the height of the water storage dam at the outlet of Powell River to give more extensive water storage in Powell Lake and make possible a consequent increase in the amount of electric energy, that will be required when additional paper making machines are installed.

The dam will be raised about another fifteen feet and the work is to cost in the neighborhood of $200,000. The project has been passed by the board of directors and arrangements are now being made to award the contract. It is expected the work will be started early this month.

Cheap Power for Lake St. John District

O. O. Lefebvre, chief engineer of the Quebec Streams Commission, talking before the Montreal Branch of the Engineering Institute of Canada, on the water power developments of Lake St. John and its tributaries, stated that the possible development of power in this district was in the neighborhood of 1,650,000 hydro-electric horsepower, being exceeded in importance only by the St. Lawrence and St. Maurice districts.

The cost of installation is estimated at as low as $50 per horse power, which is extraordinarily low, the average cost in the Montreal district, and that estimated for the St. Lawrence deep waterways project running around three times that amount. The Lake St. John and Saguenay district is already an important pulp and paper producing center.

Dominion Tar and Paper to Build on New Site

The Dominion Tar and Paper Co. has secured a lease of five acres from the Toronto Harbor Board for twenty-one years and will erect a factory to cost $200,000 upon the site. British capital is behind the enterprise, which is headed by the Earl of Dunmore and Sir Harold Bolton, who have been spending some time in Canada.

It is announced that the Toronto factory is only one of a chain which will stretch across Canada and similar plants will be established in Montreal, Winnipeg and Vancouver. The essential products made by the concern are those which are manufactured from or made with the aid of coal tar, and a supply adequate to meet the needs of the company in each city where a plant will be located is an absolute necessity.

Provincial's Report Shows Drop in Profits

A very sharp decline in profits and a considerable reduction in working capital are the outstanding features of the annual financial report of the Pronvincial Paper Mills, Ltd., issued towards the end of March. The statement reflects the condition of the fine paper industry for the first half of 1923.

The statement contains no reference to the recently rumored amalgamation of the company with the Howard Smith Paper Mills. At the annual meeting the shareholders left the proposal to install an additional paper machine at the new mill at Port Arthur, Ont., to the discretion of the directors, which means that the proposal was approved, if and when the board decides on the advisability of such an extension.

St. Maurice to Install Two 166-Inch Machines

It is understood that plans are well on towards completion for the erection, at the mill of St. Maurice Paper Company, Cap de la Madeleine, P. Q., of two newsprint machines 166 inches wide to be made by Pusey & Jones and equipped with rope drive. Additional power will be supplied by three Babcock & Wilcox boilers of 554 boiler horsepower each, and equipped with underfeed stokers and with Green economizers.

The new buildings will be required to house this equipment and will take the form of a paper machine room 288 feet long by 89 feet wide and continuing this in the form of a finishing room 128 feet long and 89 feet wide. In addition there will be a boiler house extension 105 feet by 42 feet.

Report of Pulpwood Commission Soon

The report of the Royal Commission on Pulpwood, which will be presented at Ottawa in a few weeks, is awaited with considerable interest and the taking of evidence has now been completed.

In the federal parliament at Ottawa, A. J. Lewis, Progressive member for Swift Current, Sask., stated that he considered an embargo on the export of pulpwood might be necessary in the interests of Canada. He added that he presented these views as his own and not as those of his party. He declared that the forest resources of the country were being rapidly depleted, and it had to be remembered that they should

Belgo Company's 230" "DOMINION" News Machine

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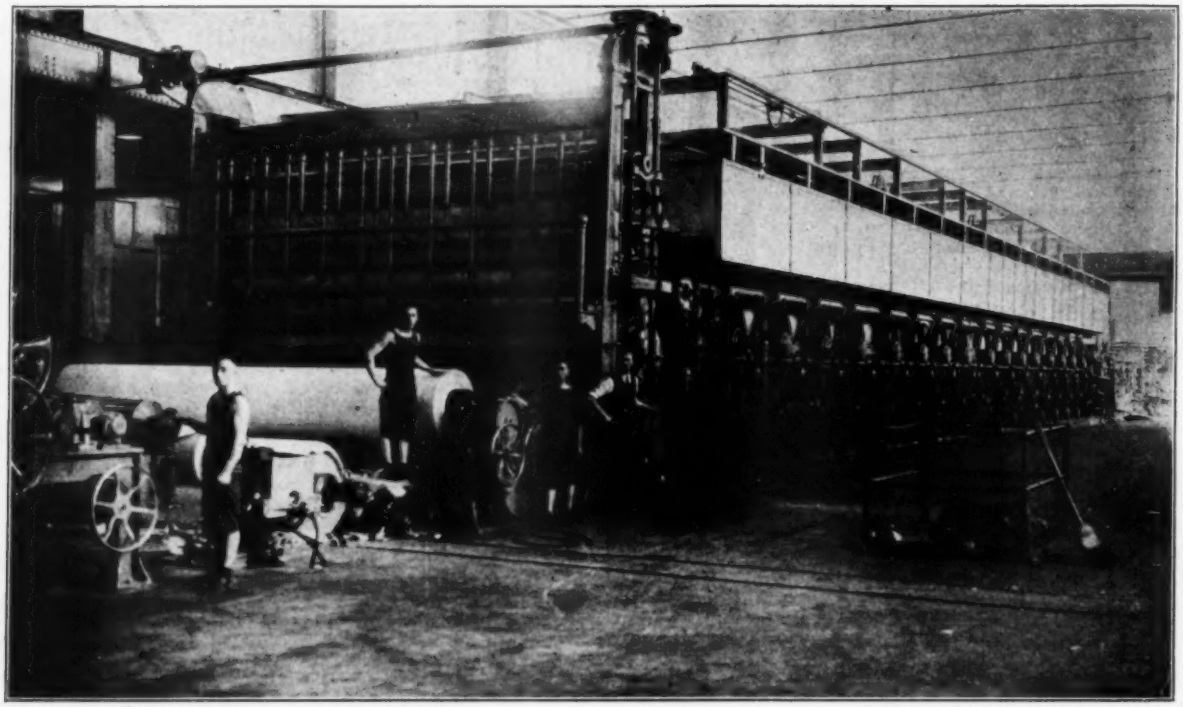


PAPER MACHINERY

PAPER MILL PUMPS

KAELIN ELECTRIC STEAM GENERATORS

Under de KERMOR PATENTS

I. P. MORRIS HYDRAULIC TURBINES

DOMINION ENGINEERING WORKS LIMITED

MONTREAL · CANADA

Canadian Section

be held not alone for the use of the present generation but also for the generations to come.

St. Regis to Build New Plant

If plans are carried out as arranged at present, the St. Regis Pulp & Paper Co. will erect a $5,000,000 plant, comprising both pulp and paper mill, at Cap Rouge, P. Q., work on which will start early this spring. The company has taken options on a large number of lands located east of the Canadian National Railway station, and in the proximity of the Cap Rouge experimental farm. This is expected to be the largest and most important of the company's mills and though the first expenditure will range under $5,000,000 within a few years, the total amount invested will reach $8,000,000.

More Improvements for International

Though the output of the International paper mill at Three-Rivers, P. Q., was recently increased from 240 to 310 tons of newsprint daily, it is expected that the production will be still further increased, probably to 500 tons, in the near future, as this can be done with a small capital outlay. This would seem advisable in view of the closing down of the three mills of the International Paper Company at Watertown, Glen Park and Brownville, respectively, at the beginning of March.

It is understood that these three mills will no longer be used for the production of paper, but will be transformed for the generation of hydro-electric current.

It is learned from the liquidators of the Bay Sulphite Co., the fate of which is closely linked with that of the Chicoutimi Pulp, that the mills of the former in Chandler, P. Q., which have been c'osed down since the liquidation was started, are to reopen at the end of this month. The receivers will operate the mills and thus prevent the conditions in that district from growing worse, as much hardship has already been encountered by the men, who were employed in the mills or working in the lumber camps for the account of the Bay Sulphite Co. This operation of the mill, however, will only be temporary until the matter is disposed of.

Kilgour Bros. New Plant Nearly Complete

Kilgour Brothers, paper bag and paper box manufacturers, Toronto, have about completed their new paper bag factory at Windsor Mills, P. Q., where they have now centralized all their power bag manufacturing operations. This will allow more space in their plant on Wellington street, Toronto, for the paper box activities. The plant of the old Paper Specialty Company, which operated in the old Gurney Building on King street, has been moved to the Wellington street plant.

The Mattagami Pulp and Paper Co., Toronto, whose plant is located at Smooth Rock Falls, Ont., is very busy at the present time and is producing 165 tons of easy bleaching pulp daily. During the first two months of 1923 the company manufactured and sold 8,600 tons, which constitutes a record. All the digesters have been relined and the plant is now in excellent shape. The company has contracted for 110,000 cords of pulpwood for the coming season, about 65 per cent of which will be taken from its own limits, while the remainder will be supplied by settlers and rail shipped.

The Court of Appeals of Montreal, full bench of five judges, recently reversed a decision of the Superior Court which dismissed an action brought by Percy Cowan et al., stock brokers, to obtain payment of four notes totaling $234,765.88, with interest, given by the Ticonderoga Pulp and Paper Co. for Riordon stock. The defendant company's plea that the shares for which payment was sought were purchased by two of their directors without the knowledge of the other directors was dismissed by the court, which unanimously upheld the merits of the appeal.

In financial circles and in the pulp and paper industry eyes are turned towards the Chicoutimi and Lake St. John district where developments of great magnitude are forecast and expected to come about before the end of this month as a result of the liquidation of the Chicoutimi Pulp Co. Lord Rothermere, the English newspaper magnate, is due in Montreal this week, while Sir William Price, who is still abroad, will arrive some time this month, and both are known to be following closely the recent developments in the Chicoutimi pulp group.

At a meeting of the Riverdale Kiwanis Club in Toronto a few days ago, W. A. Peacey, of the Mail and Empire of Toronto, gave an interesting address on "The Manufacture of Newsprint," in which he outlined the process by which logs are transformed into paper, and demonstrated by the aid of samples supplied by the R. J. Booth Co., of Ottawa, the newsprint in the various stages of its manufacture from the log of wood to the roll of paper ready for the printing presses.

Hon. James Lyons, minister of lands and forests in the Ontario government, recently announced that Captain W. R. Maxwell has been engaged to take charge of the forest protection flying squadron in northern Ontario. He will establish depots in the north for the thirteen areoplanes recently purchased by the government and will have complete charge of the service at a salary of $4,500 a year. A sum of $55,000 has already been spent on the new service.

At the beginning of March a conference was held in Toronto at the office of George Carruthers, president of the Interlake Tissue Mills, Ltd., between members of the text book committee and a representative of the Westinghouse Electric Company, Ltd., for the purpose of checking up on the description of the Westinghouse Electric Drive which is to appear in the fifth volume of the text books of the pulp and paper industry.

At a recent meeting of the Toronto Carton Club the name of the organization was changed to "Toronto Carton Council."

Tell Us the Conditions

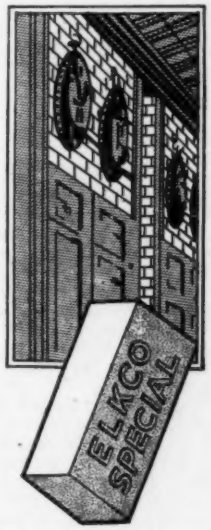
and we'll specify the brick.

The making of pulp and paper is not accomplished under conditions common to all. They vary greatly.

The fire brick that would suit one condition or equipment might fail in another.

There is as great a difference in fire brick clays and processing as there is in the selection and processing of raw material in the paper industry.

When we know the condition, we can specify the right brick.



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Statistics May Lie, but Figures Don't

Here are some FIGURES:

A Fourdrinier Machine 152" wide, running at a speed of 650 feet per minute.

A Wire running 26 days.

Machine making 55 tons of News Print every 24 hours.

1—Wire travels a distance of 4,500 miles during its life.

2—There is a dead weight of 1,421,000 pounds passing over the Dry Box every 24 hours or 59,200 pounds every hour or 990 pounds every minute. Add to the above a suction of one ton per box and you will get a partial idea of what a wire is called upon to perform.

3—22,000,000 pounds of water flow onto the wire every 24 hours or 572,000,000 pounds in 26 days.

4—Furthermore the wire is called upon to pull the whole wet end, carry its own weight, also weight of deckle and stretch roll and overcome all friction on the wet end. When it has done this we think you will agree that it has performed its duty. We have been asked on various occasions if we put the best material in our wires; well, after reading the above we think you will agree that we do.

CAPITAL WIRES

Capital Wire Cloth & Mfg. Co., Ltd.
OTTAWA, CANADA

Contract Awarded for Big Pulp Mill

A contract for the erection of the pulp mill of the Albany Perforated Wrapping Paper Co., at Sheet Harbour, Nova Scotia, was concluded in Halifax on Saturday with the Parsons-Ed Company, Limited, of Moncton, and actual construction work will begin this week, J. F. Parsons, who negotiated the contract for his company, told The Morning Chronicle. The A. P. W. Co. was represented by W. S. Crandell, General Manager, and Seth Wheeler, Jr., Vice President, who spent three days last week at Sheet Harbour, and who leaves this morning for Albany, N. Y. The contract price was not disclosed.

The building contracted for on Saturday will be 185 x 72 feet, and will be constructed of reinforced concrete and brick. All the material that can be procured for the building in Nova Scotia will be purchased in the province, Mr. Parsons stated, and local labor will be employed to the fullest possible extent throughout the construction work, he said. About 150,000 brick will be required, and these will come from Pugwash. This week a number of men will be put to work and the force employed in the erection of the building will average between forty and fifty men.

The contract stipulates that the building shall be completed by August 1st, this year, and the record of the Parsons-Ed Company indicates that it will be ready on time. This concern built the Municipal Home at Mabou, which was opened in January, and the principals before forming the existing company, which has been doing business about two years, had charge of the construction of the huge T. Eaton building at Moncton. They are now engaged on a storage warehouse in St. John.

The machinery for the Sheet Harbour pulp mill has all been ordered for delivery not later than next June, Mr. Crandell recently said, and as soon as the Nova Scotia Power Commission is ready to deliver the power for which the company has contracted, the mill will start production. This mill will have a production of 100 tons of ground wood pulp per day and a large portion of this pulp will be shipped via water to their paper mills in Albany, N. Y.

Straw Pulp Possibilities

An adequate and continuous supply of paper pulp has been an outstanding question for a decade or more—one which creates apprehension in the American mind as our vast forests of spruce and other pulp woods succumb to the rage of the printing and other paper-consuming industries.

It is reported by the U. S. Department of Commerce that considerable interest is being aroused in Manitoba, Canada, over the possibility of manufacturing pulp suitable for the manufacture of high grade white paper from wheat, oat and rye straw.

Recently about 200 bales of straw were shipped to Grenoble, France, where it is proposed to have it manufactured into pulp by what is known as the De Vains process.

It is said that the De Vains Company contemplates the erection of mills in the vicinity of Winnipeg, Canada, with a capacity of 50 to 100 tons of pulp daily, if present experimental results prove satisfactory.

If the Canadian project proves successful, it will undoubtedly be extended to the United States before long. A step would be taken toward conserving our remaining pulp wood forests, and for years to come, lay at rest the fear under which we have been laboring that our supply of paper would some day be exhausted to the point where we would be obliged to import at prices fixed abroad.

Canadian Section

The big rebuilt plant at Longueil, P. Q., of Charles Walmsley & Co. (Canada), Ltd., is now completed and the production of pulp and paper machinery is going forward at a rapid pace. The company not only make Fourdrinier machines and other equipment, but are also special agents for the Tremor screens, the Warren magazine grinder, Gwynne's centrifugal pumps, etc.

Preparations are being made for the reopening of the paper mill at Bear River, N. S. It will be operated by the Bear River Pulp & Paper Co., which was organized to purchase the assets of the defunct Clarke Bros., Ltd. The company is represented at Bear River by C. W. Rantoul, who recently went over from New York to undertake the work of preparing the plant for the resumption of operations.

Louis Boivin, who for some time has been employed with the Abitibi Power & Paper Co. at Iroquois Falls, Ont., recently resigned to take up his residence in Ottawa. He is the inventor of a paper stock regulator which he has perfected after twelve years of work. This regulator is so much in demand that from now on Mr. Boivin will devote all his time to installing it in various mills.

Plans have been prepared and machinery ordered for a complete 90-ton sulphite mill to be erected at Prince Rupert, B. C., by the Prince Rupert Sulphite Fibre Co., Ltd. It will take seven or eight months to get the machinery, some of which has had to be ordered in Europe. In the meantime the site will be prepared and the building erected, and the work on this is to be started in a short time.

The waste paper business formerly carried on in Ottawa by A. L. Florence & Son has been taken over by a new company which has been incorporated under the name of The Capital Paper Stock Co., Ltd. The new organization will be controlled by E. Pullen, of E. Pullen, Ltd., Toronto, as president; Harry Pullen, vice-president, and A. T. Brown, secretary-treasurer.

H. F. E. Kent, who was president of the Canadian Pulp and Paper Association in 1923, was re-elected president and general manager of the Kinleith Paper Mills, Ltd., St. Catharines, Ont., at the annual meeting of the company. H. H. Love is the vice-president, George H. Jefferson the secretary and A. G. Parker the treasurer.

A fire which broke out at La Tuque, P. Q., on the 17th of March caused damage estimated at $150,000, and for a while menaced the whole town. La Tuque is a thriving municipality which has grown around the mills of the Brown Corporation, a subsidiary of the Brown Co., Portland, Me.

Mr. Daniel H. Haigh, director of Charles Walmsley & Co., (Canada) Ltd., who has until recently been located at Longueuil, where the company's manufacturing plant is, has transferred his office to the Charles Walmsley & Co. (Canada) Ltd., office in the Drummond Building, Montreal.

To further organization of forest protection in Canada, a "Save the Forest Week" has been proclaimed by order-in-council passed by the federal government. The dates are fixed for April 27 to May 3, 1924.

George H. Anson has resigned as manager of the Abitibi Transportation & Navigation Co. and W. H. Potter has been appointed general superintendent in charge of the railway and yard operations.

Thomas J. Boddy, formerly of the Buntin Reid Company, Toronto, has joined the staff of the Allan Paper Company, Simcoe street, Toronto, as city salesman in succession to the late C. W. Price.

A public offering will be made early this month of an issue of $2,500,000 twenty-year six and a half per cent sinking fund gold bonds of St. Lawrence Paper Mills, Ltd.

Joseph Kilgour, Toronto, president of the Canada Paper Company and of Kilgour Brothers, has returned from St. Petersburg, Fla., where he spent several weeks.

The Clyde & Sissiboo Pulp Co., of Clyde River, N. S., shipped to England from Shelburne 2,000 tons of groundwood pulp produced at their mill at Clyde River.

J. N. Stephenson, editor of the Pulp and Paper Magazine of Canada, who is in charge of the pulp and paper exhibit at the British Empire Exhibition which will open at Wembley on April 23rd, sailed for London on the Ansonia from Boston on March 23rd to supervise the setting up of the exhibit, and will remain at the exhibition until it closes at the end of October. Before he embarked a farewell luncheon was given in his honor by the Monteral Paper Club.

The seed extraction plant of the Federal government at New Westminster, B. C., has been closed down for the season. The output of the plant was made up of 3,700 pounds of Douglas fir, 1,250 pounds of Sitka spruce, 30 pounds of red cedar, 6 pounds of hemlock and 200 pounds of other varieties of seeds. About 2,600 pounds are to be sacked and forwarded shortly to various points in the Dominion and the United Kingdom.

On the 13th of March the Montreal Branch of the Engineering Institute of Canada heard an address on paper making, ancient and modern, by H. J. G. McLean, of Chas. Walmsley & Co. (Canada), Ltd. He outlined the history of paper making from its origin in China down to the present day, and then dwelt at length on the recent phenomenal development of the industry in Canada.

G. E. Farlinger, of the Farlinger Co., Sioux Lookout, Ont., says that his company will erect a pulp mill at that place in the near future, and eventually will add a paper mill to turn out the finished product. Engineers wil soon be set to work to develop the water power on the English river. The company is capitalized at $2,500,000 and will contract to furnish the town with light and power.

Speculators are still continuing to make a stir about the stock of the large pulp and paper companies. Now that the merger negotiations involving several of the large mills of the St. Maurice Valley have been called off rumors are being floated of a prospective merger of Howard Smith and of Provincial Paper, but the officials of both companies have denied that such plans are under discussion.

Herbert L. Thomas

Herbert L. Thomas, aged fifty-two years, head of the purchasing department of J. R. Booth, Ltd., died at Clifton Springs, N. Y., on the third of March, following a nervous breakdown.

Mr. Thomas was born at Bristol, England, and after graduating with the degre of Bachelor of Arts from London University, came to Canada twenty-seven years ago and entered the employ of John R. Booth.

Mrs. J. M. McCarthy

The death occurred in Quebec on the twenty-ninth of February of Mrs. McCarthy, wife of James M. McCarthy, vice-president of Price Bros. and director of the Quebec Power Company and of a number of other public utility companies.

J. M. IVERSEN

The death of J. M. Iversen occurred at the Montreal General Hospital on March 28th, at the age of 61 years.

Mr. Iversen had been for the last eight years superintendent of the Kraft department at the St. Maurice Paper Co., Cape Madeleine, Que. He was a pioneer in the Kraft industry in Canada, having arrived at Windsor Mills, Que., in 1906 from Norway. Mr. Iversen is survived by his wife and five children, two sons and three daughters.

The Thames Paper Co., Ltd., of England, has changed its name to the Thames Board Mills, Ltd. This change is one in name only, and does not involve any alteration whatever in the directorate, management or personnel.

SCORE CUT
CAMACHINE 18 - PAPER MILL MODEL, 102" WIDTH
PICTURE OBTAINED THROUGH THE COURTESY OF THE
WARREN MANUFACTURING Co. HUGHESVILLE, N.J. MILL.
TWO OTHER MACHINES OF THIS TYPE ARE INSTALLED AT THEIR MILFORD, N.J., MILL.
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PATENTEES AND BUILDERS
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WINDERS AND REWINDERS FOR EVERY ROLL REQUIREMENT IN PAPER AND BOARD MILLS, CONVERTING & PAPER GOODS PLANTS
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Good Reels Deserve Good Rolls—

Rolls of paper made on a good roll-winder. Why fill up your reels with good paper only to waste time, make broke, and hold up production, coddling along an inefficient winder?

A **CAMACHINE 18,** winding direct from the reels, or from jumbo rolls in the finishing room, produces good shipping rolls of paper and board, from any kind of paper, good or not so good. It saves time, minimizes broke, eliminates claims for defective rolls, and replaces with a happy smile that fiercely set, desperate look on the face of the winder-man.

Let us tell you more about **CAMACHINES.** Our complete line of slitting and roll-winding machines includes one or more that will fill your needs.

CAMERON MACHINE COMPANY

61 POPLAR STREET, BROOKLYN, N. Y.

Wisconsin News

April 1, 1924.

Meeting of Kraft By-Products Association

A meeting of the Kraft By-Products Association, which is composed of Kraft mills in the states of Wisconsin and Minnesota was held at the Old Colony Club in Chicago on Friday morning, March 8th.

It is considered likely that within a short time the reclamation of by-products in connection with the production of Kraft paper will be an important factor in the industry. Professor A. H. White, of the Chemistry Engineering Department of the University of Michigan, who is the consulting engineer for this association, told the members of this association that he expected at the next meeting to have completed all the laboratory work along every line which might develop a lead for reclaiming the by-products and methods of carrying on the work.

In the development of this important work it was the original plan that the mills send the waste to a central point, all to be put through one plant, but it is the opinion of Dr. White that it will be possible to work out separate units at each pulp mill to allow the reclaiming of valuable by-products and at the same time re-use the waste by reclaiming the sludge.

As soon as final reports and figures are obtained it is expected that one of these reclaiming plants will be built on one of the company's properties and the reclamation of these valuable by-products started.

The following attended the above meeting:

Mr. J. H. Delbridge, representing Falls Manufacturing Company of Oconto Falls, Wis.

Mr. O. Bache-Wiig, representing Wausau Sulphate Fibre Company of Mosinee, Wis.

Mr. E. G. Goodell, representing Stevens Point Pulp & Paper Company of Stevens Point, Wis.

Mr. G. W. Forrester, representing Minnesota & Ontario Paper Company of International Falls, Minn.

Mr. B. T. McBain, representing Nekoosa-Edwards Paper Company of Port Edwards, Wis.

Professor A. H. White, consulting engineer of this Association, of the University of Michigan.

Mr. J. E. Alexander, of the Nekoosa-Edwards Paper Company is secretary and treasurer of this association, and Mr. B. T. McBain, of the same company, is chairman.

B. T. McBain to Return to the Pacific Coast

B. T. McBain, director of manufacturing and assistant general manager of the Nekoosa-Edwards Paper Company, with mills at Nekoosa and Port Edwards, Wisconsin, has tendered his resignation to the president and board of directors, asking that it be made effective July 1st, 1924. It is understood that his three-year contract expires on April 15th and that he has given the notice necessary called for therein to be given in case either party should wish to terminate same.

Mr. McBain has taken an active interest in association work since coming from the Pacific Coast, where he was operating manager of the Crown Willamette Paper Company's mills in Oregon and Washington.

He is now a member of the executive boards of the Technical Association, the Woodlands section of the American Paper and Pulp Association, also of the Pulp section; third vice-president and member of the executive board of the Superintendents' Association, chairman of the Kraft By-Products Association of Minnesota, Wisconsin and Michigan, and secretary of the Wisconsin Forest Protective Association.

It is understood that Mr. McBain is going to return to the Pacific Coast, in connection with a new enterprise, and he will continue in the pulp and paper manufacturing industry.

During the month of February Mr. McBain was on the Pacific Coast spending the entire time in the states of Washington and Oregon. It was during this time that he made investigations on some new projects, these being made in the interest of his present employers.

His many friends and fellow workers will be very sorry to see him leave and his host of friends and former men, with whom he worked on the Pacific Coast for twenty-seven years, will welcome him back among their midst.

Meeting of Wisconsin Forest Protective Association

The meeting of the Wisconsin Forest Protective Association scheduled for the Francis. The First Room, Congress Hotel,

DUXBAK BELTING
TRADE MARK
for
wet places,
dry places,
hard drives
—an ideal belting for paper mill drives
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Leather Belt Mfrs.
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73 Ferry Street, NEW YORK
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SIMONDS
Barker and Chipper
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The best knives for Pulp Mills. Made of the finest edge-holding steel, skillfully made and tempered right to withstand wear.
Write for Catalog and Prices
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PRODUCTS:

Calenders
Castings (Iron and Brass)
Cement Sack Machinery
Cores (Collapsible)
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Cylinder Machines
Die Presses
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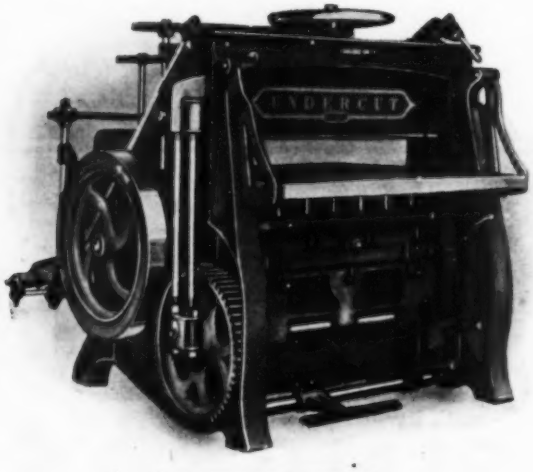
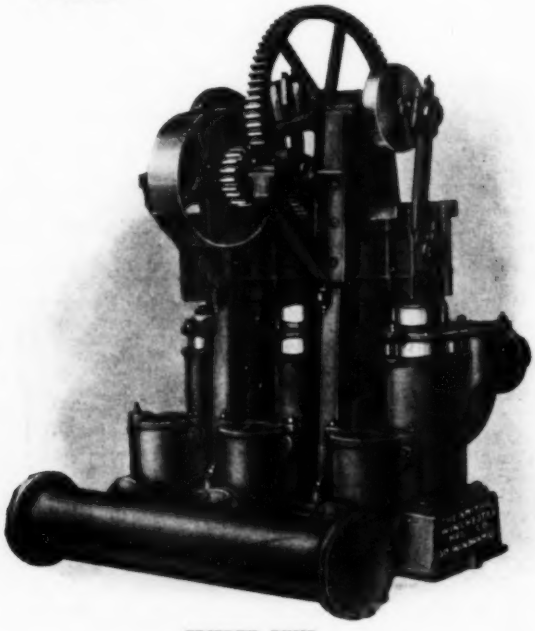
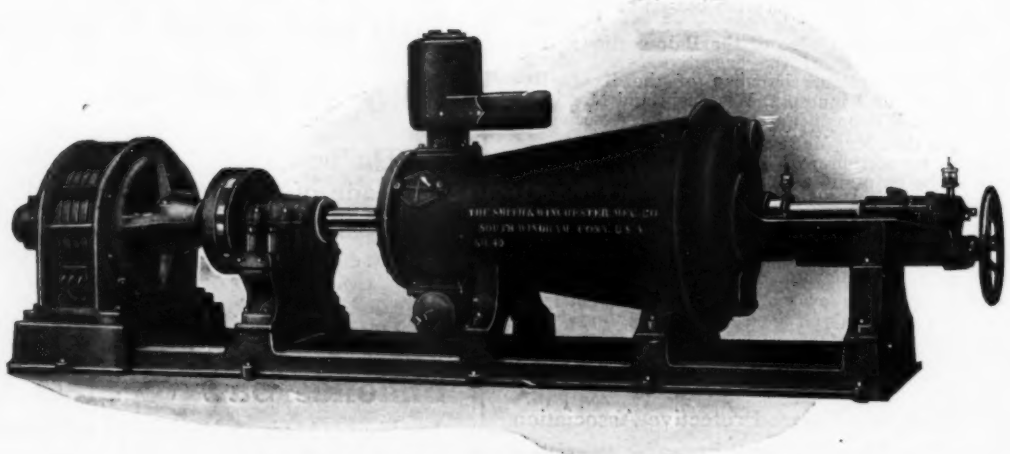
Flour Sack Machinery
Fourdrinier Machines
Jordan Engines
Millinery Bag Machines
Paper Bag Machinery
Paper Cutters
Paper Cutting Machinery
Paper Making Machinery
Pumps
Reels
Rolls
Shower Pipes
Stuff Pumps
Trimmers
Valve Bag Machinery
Wet Machines
Winders



THE UNDERCUT TRIMMER



TRIPLEX PUMP



THE SMITH & WINCHESTER MODEL 40 JORDAN ENGINE

Chicago, Ill., was held in the French Room at the same hotel at 3 o'clock on March 12, 1924.

Those present were:

O. Bache Wiig, of Wausau Sulphate Fibre, Co., Mosinee.

D. C. Everest, of Marathon Paper Mills Co., Rothschild.

Mr. Baker, of Dells Pulp & Paper Co., Eau Claire.

Mr. Guy Waldo, of Flambeau Paper Co., Park Falls.

Messrs. Johnson and J. H. Delbridge, of Marinette and Menominee Co., Marinette.

Mr. W. J. Sullivan, of Grandfather Falls Co., Merrill.

Mr. B. T. McBain, of Nekoosa-Edwards Paper Co., Port Edwards.

Mr. O. T. Swan, representing the Northern Hemlock and Hardwood Association, and Mr. E. E. Hubert, president of the Madison Chapter of the National Association of Foresters, were guests.

After regular business matters were gone over and the secretary had reported on the progress during the time between the meetings, Mr. Swan, secretary and manager of the Northern Hemlock and Hardwood Association, stated his views. He said that he thought both his association and the Wisconsin Forest Protective Association were working toward the same end and that fire protection and taxation were things holding up timber development. He said his association favored the McNary bill and that all should work together to get the needed results.

After Mr. Swan, Mr. Hubert, president of the Madison Chapter of the Forestry Association, told of the workings of that association and how his association could help in the work, and that his organization was glad to help in every way possible. Mr. Hubert said his association was doing all within its power to protect fires in the forests and working on taxation. It was his idea that industrials, foresters, sportsmen, etc., should work together in one state organization for forest protection.

A committee of three, consisting of the president and secretary and a third member to be appointed by the president, are to meet with a like committee from the Northern Hemlock and Hardwood Association to arrange for the co-operation of the efforts of both associations into one and thus avoid any duplication of work.

Something has started in Wisconsin along a much needed line and it will be interesting to watch the results obtained through this association.

Farmers Using Large Quantities of Lime Sludge

Large quantities of lime sludge from the mills of the Wausau Sulphate Fibre Company of Mosinee, Wisconsin, the Stevens Point Pulp and Paper Company at Stevens Point, Wisconsin, and the Nekoosa Mill of the Nekoosa-Edwards Paper Company are available for farmers.

All of the available supply from the Wausau Sulphate Fibre Company has been disposed of as soon as it was available. Most of this has been loaded into gondolas and shipped around the state.

The supply of this material at the Stevens Point Pulp and Paper Company has been deposited on the company's land there and the farmers have begun hauling this material away, there being a continual line to get this material.

Until recently there has been only a very little of this disposed of at the Nekoosa-Edwards mills. Arrangements have been completed and a large pile is now ready for the farmers. Suitable conveyors have been built so that the lime sludge can be loaded directly into the cars. There is no charge made to the farmers who drive into the wood yard where the material is and load it themselves.

The use of this lime sludge has been a great help to the farmers and is particularly valuable in use with the growing of such crops as alfalfa, beans and clover.

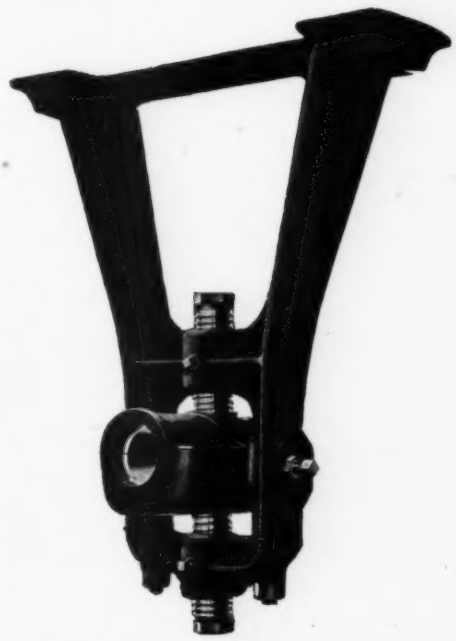
Push Production to 100 Tons

The Marinette and Menominee Paper Company, a subsidiary of the Continental Paper and Bag Mills, of New York, has reached a production of 100 tons of paper a day and is now employing more than 500 men, according to recent reports.

At the mills on either side of the Menominee River in Marinette and Menominee approximately twenty-five grades of paper are being manufactured in three types of finish, dry finish, machine glazed and water finish.

The company has just completed the drilling of a well 800 feet deep in order to get good cold water for the purpose of getting a higher absorption of sulphur dioxide in the manufacture of sulphite pulp. The company also plans consider-

POWER TRANSMITTING MACHINERY



Fifty Years In Service *and* Still Going Strong

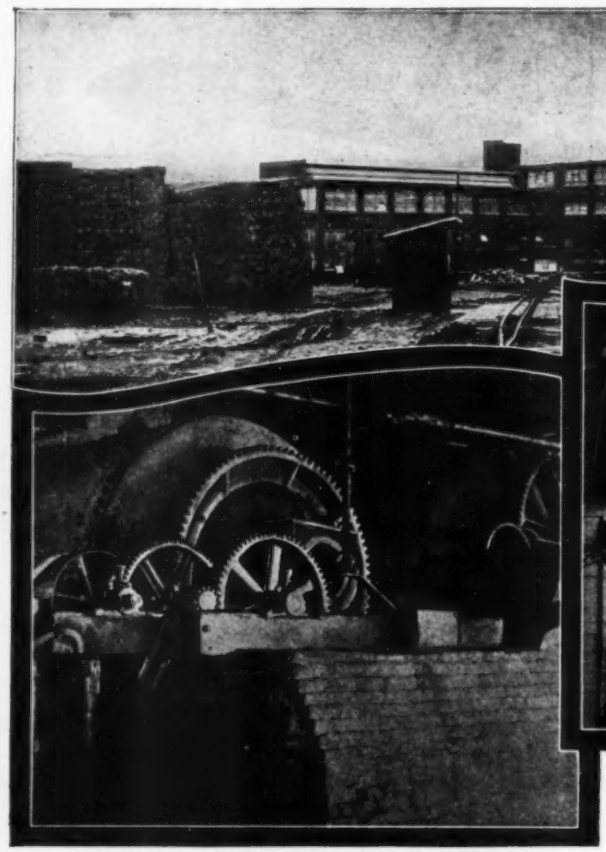
When you put up a new plant, or consider transmission replacements, keep in mind that nothing takes the place of CAST IRON for hangers.

In choosing hangers it is length of efficient service you should buy—nothing else—and "Universal Giant" Ring Oiling, Ball and Socket, CAST IRON Hangers are permanent equipment—practically indestructible.

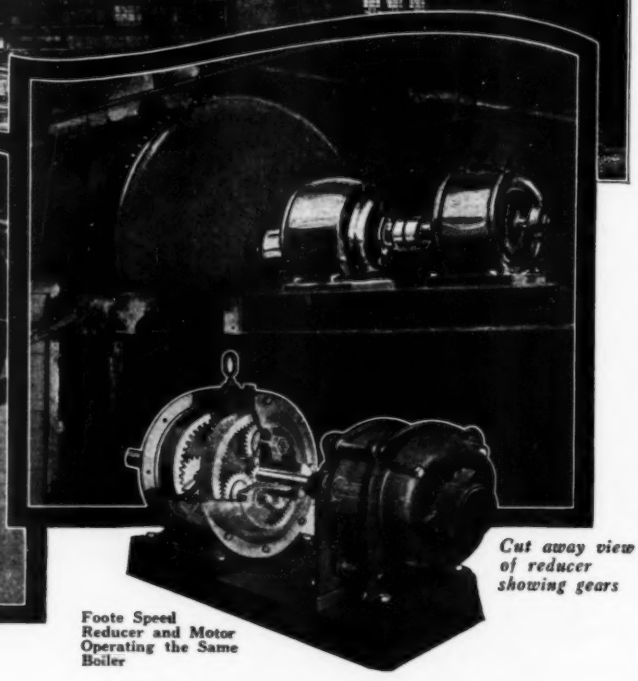
Cast Iron Hangers which we built and put in service 50 years ago are still going strong. You couldn't ask for better service than that.

Buy from the "Universal Giant" line of transmission equipment and you'll be money in pocket.

T. B. Wood's Sons Company
CHAMBERSBURG, PA.



A Rotary Boiler, Containing Waste Paper Stock, Operated Through Series of Gears



Foote Speed Reducer and Motor Operating the Same Boiler

Cut away view of reducer showing gears

Your Equipment Needs This

Wherever a reduction in motor speed of 3 to 1 or more is necessary Foote Speed Reducers will do the work at a saving in installation cost, operation cost, maintenance cost, replacement cost, and power cost.

Foote Speed Reducers replace open equipment such as belts, chains, ropes, open gearing, etc. Because they are entirely enclosed with all moving parts running in oil, they deliver from 86 to 94% of the motor power, provide positive safety to workers, and give uninterrupted service.

They are ideal for use on storage tanks, mixers, conveyors, and other paper mill equipment.

Tell us about your equipment and let our engineers show you why you need Foote Speed Reducers.

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FOOTE BROS. GEAR & MACHINE COMPANY

Manufacturers of Rawhide and Bakelite Pinions and Cut Gears of All Kinds.
Send for Catalog.

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King & Knight, Underwood Bldg., San Francisco, Calif.

able building, remodeling and extending, an agreement just having been reached with the city of Marinette which provides for the vacating of certain land, allowing a site for additional building. Incorporation records at Madison also indicate that the parent company has recently set aside a sum of money in excess of $200,000 for work in Wisconsin, but the nature of the expansion has not been definitely announced.

Superintendents of Three States to Meet

The committee in charge of the Convention of the Northwest Division of the Pulp and Paper Mill Superintendents' Association to be held in Marinette, Wisconsin, May 2-3, 1924, report very satisfactory progress on program and other arrangements to make this gathering a memorable one in every respect.

There will be papers on every subject of importance now up before the industry and they are to be of such nature that the discussions brought out will be of great value to all the membership.

The paper to be prepared and read by Mr. J. H. Slater on the manufacture of groundwood will, in itself, be of enough value and importance to Wisconsin pulp mill men to send all representatives, hundreds of miles to get the benefit of his long experience and successful operation of such plants.

Mr. L. E. Smith, of Nekoosa-Edwards Paper Company, is Chairman of the Northwest Superintendents' Association, while Mr. A. G. Stone, of Marinette & Menominee Paper Company of Marinette, and Paul Smith, of Combined Locks Paper Company at Combined Locks are Vice-Chairmen.

Northern Mills of Green Bay Purchases Water Power

The Northern Paper Mills Company of Green Bay, Wisconsin, have purchased a waterpower from the White Rapids Paper Company of Oshkosh, Wisconsin, the White Rapids power which is capable of developing 10,000 horsepower. Included in the deal is a considerable acreage of land and also several miles of river front.

This power is said to be one of the largest on the Menominee river and is situated west of Swanson, in Menominee county, Michigan. Engineers estimate that 10,000 horsepower can be harnessed there.

It is understood that the Northern Mills are planning to develop this power and will transmit it to Green Bay where it would be used in operating the company's paper mill; it is also rumored that the property is to be used for construction of a pulp mill for the Northern Paper Company but no definite statement has been made.

This power is said to be the largest on the Menominee River.

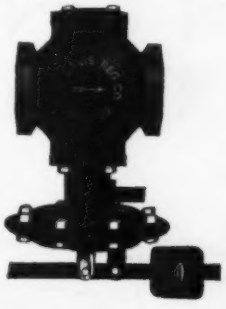
The rush of pulpwood to Wisconsin mills in the Fox River valley continues and no let-up is anticipated until the latter part of April. The receipts of wood for February and March exceed those of previous years. Most of the wood being delivered in Appleton has been consigned to the Interlake Pulp and Paper Company whose yards are stocked up as never before. Combined Locks and Kimberly and Kaukauna also are receiving large supplies.

Logging operations in the woods of northern Wisconsin and upper Michigan are being brought to a close after an unusually successful season. Except in the depth of the woods most of the snow has disappeared. Although the season was somewhat shorter than usual, the companies were able to get out a larger supply of pulpwood than usual.

Wage increases ranging from 2 to 4 cents an hour have been granted to employes of the Kimberly-Clark Company at Niagara. The increases effect lumber and paper mill workers and it is reported were found necessary to meet competition of the Ford Motor Company. The old scale ranged from 40 to 46 cents an hour.

After going for a long time without an accident the record of the Fort Howard Paper Company at Green Bay was somewhat marred recently when two employes, Harry Goben and Frank Soper, were caught in the rolls and slightly injured. Goben escaped with bruises, but Soper lost one finger.

The Peshtigo Paper Company at Peshtigo, Wis., will have its water supply increased with the completion of a new 16-inch well now being drilled. The well will be sunk to a great depth to insure a good supply of cold water.



The best heating system regulator

DAVIS REGULATORS are reliable—once set, they will maintain any desired pressure regardless of fluctuations in the steam supply. Their action is as certain as gravity because they are gravity-controlled by weighted lever arm.

There are a number of types—all are widely used in heating systems. One that finds extensive application is the famous Davis P & W Regulator, shown at the left, for use on any low pressure or vacuum system of steam heating where the delivery pressure to be maintained does not exceed five pounds.

Write the G. M. Davis Regulator Co., 414 Milwaukee Avenue, Chicago, for details of the money-back guarantee.

DAVIS VALVE
STEAM SAVERS SINCE 1875
SPECIALTIES

PRATT & CADY VALVES

Fig. 100
Bronze Renewable Ring Gate Valve

IT IS easy to renew the wearing parts of Pratt & Cady retaining ring gate valves without removing the valve from the line. Once installed it stays there! Large and comprehensive stocks at all times assure you prompt service.

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Pratt & Cady Division
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An Associate Company of the American Chain Co., Inc

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RAG CUTTER KNIVES

WATEROUS ENGINE WORKS CO., LTD.
BRANTFORD, ONTARIO, CANADA
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Michigan News

April 1, 1924.

1924 Outlook Bright

What does 1924 promise in expansion of the paper industry in Michigan?

Three projects of the first importance are assured, while indications point to the development of two others of equal importance. The year has just started.

As usual, when papermaking is talked Kalamazoo occupies the spotlight. There is no indication whatever that this city will lose its pre-eminence in that particular line. Felix Pagenstechar, president of the Bryant Paper Company, has officially announced that he intends to follow the campaign of improvement just completed at the Superior Division, by similar efforts to bring the Bryant Division up to the highest grade of efficiency and restoring it as a model, up-to-date mill. This will necessitate an outlay of approximately $500,000, but promises to be money well spent when one considers reduction in costs of operation and increased output.

L. W. Sutherland, president of the Sutherland Paper Company, has awarded to O. F. Miller Company the contract for an addition that will double the capacity of the concern's carton-making unit. The new structure will have a floor space of 58,000 square feet and will necessitate an outlay of $100,000 for building and equipment. It will make this one of the largest plants of its kind in the middle West.

Another assured addition to the list is the plant for the Dunn Sulphite Paper Company of Port Huron. Billingham and Cobb, local engineers, have finished the plans for this plant, a one-machine mill.

The fourth proposition: there is every indication that the plans for the organization of the Valley Paper Company will mature in the next 60 or 90 days and work will start on erection of that plant. Business and financial conditions have been none too bright in this community the past winter. This has influenced George O. Comfort, president of the new concern, to move cautiously in his organization campaign. He has nevertheless made steady progress towards his goal and despite many efforts of more energetic communities to secure this industry, Kalamazoo will in all probability get the mill. It naturally belongs here.

Another project is the announcement that the Standard Paper Company has purchased a large tract of land adjoining its present plant. It is a five-acre tract with adequate railroad facilities. B. C. Dickinson, president of the company, when asked "What's up?" only replied "We have bought the land. Further than that I am unable to divulge our plans or intentions for the future." That was enough to indicate that he has something up his sleeve. For many years the Standard Paper Company has been one of the most consistent money-makers in the Kalamazoo Valley district.

Another evidence of the virility of the industry is found in the list of important expansions made during the past year, the papermaking fiscal year that opens in April and closes in April. These dates are set by the annual meeting of the American Pulp and Paper Association.

Again Kalamazoo and Kalamazoo Valley district are distinctly in the lead with important building, expansion and improvement program chronicled by the Kalamazoo Vegetable Parchment Company, Bryant Paper Company, Western Board and Paper Company, Allied Paper Mills, Kalamazoo Paper Company, Watervliet Paper Company and Eddy Paper Corporation. Added to these are the expansions made by the Central Paper Company, Muskegon and Filer Fibre Company, Filer City.

Monroe, first in the manufacture of board not only in Michigan but in America, suffered due to the dullness in the board market. While the mills were operated steadily, no reports are made of any notable extensions to any of the plants there. The outlook for the future seems more favorable and a resumption of expansion programs prevalent during the past five years may again be looked forward to.

March Meeting of Superintendents

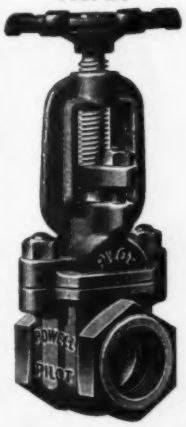
The last Superintendent's meeting was held at the Park-American Hotel on March 20th. At this meeting, Mr. R. B. Wolfe, of the Wolfe Engineering Co., of New York City, gave a speech on "Mill Management." Mr. Wolfe stated that "It is impossible to get the best results out of your help if you do not give them a chance to think for themselves. Tell your help what they are doing this thing for, and what end is being sought." He went so far as to advise giving out cost sheets every day, stating exactly how much was charged every day for doing certain jobs, and let the men see that every dollar the company took in was not profits. He said when he first tried

Iron Body or All Iron

"Pilot" Gate Valves

WITH OUTSIDE SCREW STEM AND YOKE

FIG. 480



Screwed or Flanged Ends
Working Pressure
Up to 125 Pounds

Especially Adapted for Handling ACIDS, ALKALIS & CORROSIVE SOLUTIONS.

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POWELL VALVES
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Write for Descriptive Circular

THE WM. POWELL CO.
CINCINNATI, OHIO

Made for maximum service not merely the average

TRADE JENKINS MARK

Jenkins Bros

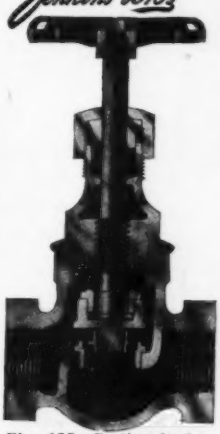

Fig. 128, Sectional view Extra Heavy Bronze Globe Valve. The valve stuffing-box can be repacked under pressure.

Repacking valves made easy

With Jenkins Valves, all that is necessary is to open the valve wide, remove the packing nut and gland, and then repack the valve. In the open position, the disc lock-nut makes a steam-tight joint with the smooth finished surface of the bonnet and effectively prevents the escape or leakage of steam up around the valve stem. This joint is absolutely tight so that the valve can be repacked even under full working pressure.

Valves for all paper mill requirements. At supply houses everywhere.

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524 Atlantic Avenue.....Boston, Mass.
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Always marked with the "Diamond"

Jenkins Valves

SINCE 1864

LUNKENHEIMER

"Ferrenewo" and "Renewo" Valves

with renewable Nickel Disc and Seat

Fig. 1021
Iron Body "Ferrenewo" Globe
150 lbs. pressure

Bronze "Renewo" Globe
Fig. 73—200 lbs. pressure
Fig. 16—300 lbs. pressure

The Bronze "Renewo" for the higher pressure and temperature lines, and the Iron Body "Ferrenewo" for the lower, form a combination which offers manifold advantages and warrant standardization throughout any plant.

In both Valves the seating surfaces are regrindable, all parts including the nickel seat and disc are renewable, the materials have great wear resisting qualities and offer a large factor of safety, and all other features necessary for the maximum economy of maintenance, service and durability, are common to both Valves.

Detailed information is given in Catalog 58 FG. Write for a copy.

THE LUNKENHEIMER CO.
"QUALITY"
LARGEST MANUFACTURERS OF HIGH GRADE ENGINEERING SPECIALTIES IN THE WORLD
NEW YORK CHICAGO CINCINNATI, U.S.A. BOSTON LONDON
EXPORT DEPT. 128-138 LAFAYETTE ST., NEW YORK

"America's best since 1862"

102-30-07

this out, he was surprised at the response he got. The men were not given any more money, but everyone was trying to beat the record made the day before. The cost of producing the article was cut, and then the men received a raise in the amount of wages that they were paid. He stated he has tried this out in a number of different places, and it has always worked fine.

Among those present were: W. B. West, E. D. Jones & Co.; Clarence Harter, Rex Paper Co.; Herb DeYoung, Allied Paper Mills; E. R. Snyder, C. E. Volkhardt, Alfred Bryant, Bryant Paper Co.; Jacob Kuss, Allied Paper Mills; J. H. Wright, Wm. Cable Wire Co.; Otto Fisher Bryant Paper Co.; W. H. Donaldson, Howell Donaldson, Inc., C. H. McMahon, Acme Co.; B. J. Winwright, W. A. Hodge, Western Board & Paper Co.; Thomas W. Peck, Parker Co.; R. W. Van Kirk, A. G. Wightman, Hawthorne Paper Co.; H. L. Atkinson, Matagami Pulp Co.; W. M. Benxing, Champion Fibre Co.; B. Benson, Williams Gray Co.; Allan Milham, Bryant Paper Co.; Ralph Clarke Kalamazoo Veg. Parchment Co.; Jos. Loughead, Western Paper Mill Supply Co.; A. Wm. Riedel, Gus Riedel & Son; Martin Mulder, Allied Mills; Rob Williams, Williams Gray Co.; Roy Breyfogle, Eddy Paper Co.; W. H. Sieviert, Michigan Carton Co.; H. F. Ansell, White Pigeon; Dr. H. C. Fleischer, Bryant Paper Co.; M. N. Brisbois, Sutherland Paper Co.; M. B. Carter, The Barrett Co.; Elbert Milham, Bryant Paper Co.; R. B. Wolf, R. B. Wolf Engineering Co.; E. H. Gilman, Bryant Paper Co.; W. F. Lawrence, Western Paper Makers Chemical Co.; W. E. Hurley, E. H. Yonke, Standard Paper Co.; Wm. Cathy, Goodrich Rubber Co.; Jacob Parent, Western Board & Paper Co.; M. Redmond, Kalamazoo Paper Co.; C. E. Urich, MacSimBar Paper Co.; A. E. Armstrong, Armstrong Machine Co.; A. E. Woolam.

Plans for Dunn Sulphite Mill Complete

Theodore W. Dunn, who until his recent resignation from the vice-presidency and directorate of the Detroit Sulphite Pulp and Paper Co., has again entered the paper manufacturing field. He has organized the Dunn Sulphite Paper Company, a $500,000 corporation to be located at Port Huron, Mich., at the head waters of the St. Clair river, where clear and cold water is obtainable, which is so important in the manufacture of the bleached M. G. Mitscherlich specialties that they will make.

The contract for the main building, which is to be two stories in height, 210 feet 10 inches long by 77 feet 10 inches wide, was awarded to O. F. Miller Co., Kalamazoo, on April 3rd, and building is to start within ten days. It is to be constructed of reinforced concrete, steel and brick, which with the steel window sash will make the mill entirely fireproof. The power plant is to be 42 feet 8 inches square, of brick with concrete floor and roof, and is to be equipped with water tube boilers, stokers and coal handling apparatus. The buildings are to be completed on or about July 15, 1924, and the plant when completed will be electrically operated outside of the variable speed engines for driving the paper machines.

The Beloit Iron Works of Beloit, Wis., are building a new 132-inch Yankee Fourdrinier tissue machine with a 12-foot dryer, which will contain all the new Beloit features, such as removable Fourdrinier part permitting a new wire to be installed in about forty minutes. It will also be equipped with the new Beloit shake, ball bearings on the breast roll, table rolls, wire and felt rolls, and numerous other modern friction reducing appliances.

The other equipment for which the contracts will be let within the next few days will be of the latest and most improved type. With all this fine equipment and organization of those who are thoroughly versed in the paper manufacturing business, the plant is assured a successful career.

Sutherland to Erect Large Addition

The Sutherland Paper Company at a meeting of the directors on March 17th, awarded the contract for a large addition to its plant, thus securing facilities that will enable the concern to take care of its steadily expanding business.

The new structure will be erected by the C. F. Miller Co. and will have 58,000 square feet of floor space. It will be one story high, with exception of a section two stories high, the intention being to place the offices of the concern on the second floor. Reinforced concrete and steel will be used and the addition with the equipment will represent an outlay of $100,000.

With the completion of this structure, the present pressroom will be extended in proportion, making it one of the largest units of its kind in the Middle West. The present offices of the company are to be converted into a comfortable rest room for

For Beating and Refining all kinds of paper stock, the best machine to buy is the

Claflin Continuous Beater

BUILT BY

THE HERMANN MANUFACTURING CO.

LANCASTER, OHIO

Ticonderoga Machine Works

TICONDEROGA, N. Y., U. S. A.

MANUFACTURERS OF

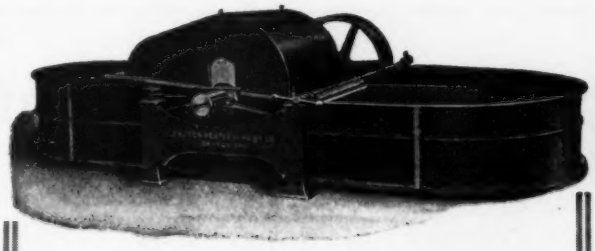
WARREN IMPROVED CALENDER DOCTORS

With Flexible Blades, Universal Adjustment and Control (PATENTED)

WARREN IMPROVED PATENT DOUBLE DRUM WINDERS

Patent BALL VALVE Hydrant
Stock Circulating Systems *and*
other Paper Mill Specialties

SEND FOR OUR BULLETIN



"Dayton"
Beating Engines
are Built
for
Heavy Duty

Dayton Beater and Hoist Co.

DAYTON, OHIO

FOR SALE

One large type Marshall refining Jordan engine, used very little. EDDY PAPER CORP., Three Rivers, Mich.

FOR SALE

Two (2) Fitchburg Steam Engines 40 H. P., 125 lbs. steam pressure; 20 lbs. back pressure; 70 to 125 R. P. M. Length of engine, 12'6"; width of engine, 6'8". These engines can be direct connected or a belt drive and are in A-1 condition.

Three (3) Noble & Wood 1,000 lbs. capacity Beating Engines; wood tub; 48 x 48" roll; 72 x 16½" pulley. These Beaters are in good condition.

Two (2) 63" Smith & Winchester Undercut Paper Cutters.

Address Box 62, Paper Industry.

Robins Conveying Systems

FOR HANDLING BULK MATERIALS

Write for Handbook of Conveyor Practice

ROBINS CONVEYING BELT COMPANY

New York Chicago Pittsburgh Boston

FOR SALE

One 120" Fourdrinier Paper Machine—Equipped with Pusey & Jones new Century shake; two presses; 48" diameter dryers; calender; reel; Warren winder; self contained Marshall drive.

One 90" Fourdrinier Tissue Machine—Equipped with Pusey & Jones new Century shake; two presses; nine dryers 36"x86"; one calender; two drum reel; four drum Moore and White winder. Self contained Marshall drive.

Fourdrinier Parts—One 120". One 110". One 84" Pusey & Jones. One 86" Kutter Trowbridge.

Dryers—Nine 48"x116". Two 48"x111". Fourteen 36"x86". Nine 36" by 80".

Machine Calenders—One 104". One 84" ten roll. One 72" nine roll. One 72" seven roll. One 66" seven roll. One 58" five roll.

Slitters and Winders—One Moore & White four drum. One 120" Warren two drum. One 104" Kidder. One 90" Pusey & Jones single drum. One 36" Fales. One 27" Meisel.

Beaters—Three 72"x42" Noble & Wood. One 54"x60" Holyoke. Two 48" by 52" Holyoke. Two 52"x42" Downingtown Iron tub. Five Horne 36"x36".

Jordans—One Appleton Wagg Majestic. One Jones Standard for motor drive. Two Noble & Wood Monarch. One Noble & Wood Pony Monarch. One Pope Brushing engine.

Screens—One twelve plate Packer. One twelve plate New Success. Six, twelve plate Harmon.

Ream Cutters—One 69" Jones undercut. One 56". One 48". One 44" Smith & Winchester undercut.

Revolving Sheet Cutters—One 84" Horne. One 82" Clark. Two 60" Hamblet. Two 60" Finlay. One 62" Moore & White. One 48". One 45". One 42" Finlay with Hamblet drive.

Super Calendars—One 52" Holyoke. One 50" and one 48" Norwood. One 45" and one 40" Pusey & Jones.

Wet Machines—Bagley & Sewall 72". Horne 48". Equipment for pulping old papers.

FRANK H. DAVIS CO.

175 Richdale Ave. Cambridge 40, Mass

The Paint Question

YOUR search for a paint that will stand up under moisture, chemical fumes and heat conditions comes to an end when you begin using BITUMASTIC SOLUTION. It gives enduring protection to metal buildings, structural steel, tanks, pipes, stacks, boiler fronts and breechings and other steel surfaces. Has a fine glossy finish that lasts. The sooner you start using BITUMASTIC, the sooner your worry over the paint question ceases.

One trial will do more convincing than a hundred advertisements. We are willing, therefore, to send a sample can of BITUMASTIC SOLUTION, without charge, to interested executives and engineers.

BITUMASTIC

WAILES DOVE-HERMISTON CORPORATION

17 Battery Place, New York

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employees, being furnished to add to their comfort and general welfare.

It was only last summer that the Sutherland Paper Co. completed the task of reclaiming and filling a large area of low land just to the east and south of its plant. This was planted and seeded, making an attractive plat. Now that site must disappear to make room for the proposed addition.

K-V-P Installs New Filter Plant

Delivering a perfect water for paper making at the rate of 9,306,000 gallons a day is the accomplishment achieved by the new filtration plant installed for the Kalamazoo Vegetable Parchment Company, by the Power Plant Specialty Company of Chicago.

The plant, which includes the intake pump house and filter house and feed lines, occupies a triangular piece of ground 60 feet wide at the narrow end, 145 feet wide at the other end, and 600 feet long. The filter house has a ground area of approximately 12,000 square feet. Of this space the primary filters, 16 in number, have an area of 3,440 square feet. The balance of this structure is devoted to chemical mixing processes. According to F. F. Vater, president of the Power Plant Specialty Company of Chicago, this is the most complete and most successful plant in the country treating water for industrial purposes.

Water is taken direct from the Kalamazoo river but two miles below the dumpage of every other mill in the city, and transformed from a veritable quagmire of nauseous filth by treatment and turned to the manufacture of paper clear, free from odor, free from algal spores, while tested samples have been negative for pathogenic bacteria, in every way a water ideally adapted for the manufacture of high grade papers. Minimum in chemical cost and a corresponding low cost in labor are provisions in evidence in the construction of this unit.

Concludes Extensive Building Campaign

In Muskegon, the Central Paper Company is completing a campaign of expansion in both its paper mill and pulp division. In the paper mill a 104-inch Bagely and Sewell Fourdrinier has been added to a battery of two 96-inch and one 120-inch Fourdriniers, increasing the daily output from 65 to 120 tons. The new machine runs almost exclusively on No. 1 Kraft.

Three digesters have been added to the sulphate mill. New Badenhausen boilers replace the Babcock and Wilcox battery. The reciprocating steam engines have been taken out and steam turbines added. Nearly the entire mill has been electrified.

During the past 12 months the Central Paper Company has engaged in an extensive building campaign, which includes erection of six concrete and brick structures. One building is 165 x 50, one 150 x 75, one 50 x 40, one 270 x 50, one 45 x 90 and one 90 x 60 feet. The entire plant is in first class condition.

Paper Mill Executives to Discuss Trade Topics

A meeting is being planned for May 2 and 3, at Marinette, Wis., by the paper mill superintendents of the northwestern district, the purpose of which will be a thorough discussion of trade topics. This district consists of the mills in the Michigan Upper Peninsula, the Fox River Valley, the Wisconsin River Valley and the Menominee (Michigan), Marinette and Peshtigo (Wisconsin), mills.

It is anticipated that this convention will probably bring about 200 representatives to Marinette. The official list will consist of about 50 superintendents representing around 40 mills of Michigan and Wisconsin, and the remainder will be other executive employees.

It is reported that Grand Rapids paper distributors and wholesalers have been invited to send a delegation. It is expected that the Grand Rapids delegation will join with the Kalamazoo delegation and charter a special car.

Several Changes in K. V. P.'s Officers

Jacob Kindleberger, president of the Kalamazoo Vegetable Parchment Co., announces some new changes. Mr. R. A. Hayward, of the University of Michigan Extension Course, will be general manager starting April 1st. Mr. Kindleberger will retire as general manager of the plant, but retains the presidency of the company.

Mr. Hayward has been connected with the mill in a consulting capacity during the last year.

PAPER MILL MACHINERY

4—Mammoth Jr. Jordan engines, mfg. by Noble & Wood Co. Shell 5′ 6″ long with 10″ inlet and 6″ outlet. Outlet adjustable to four positions. Run either direction at 350-375 r.p.m.

7—823 h.p. Stirling Water Tube boilers, 200 lbs. pressure. Babcock & Wilcox makers. Complete with Westinghouse stokers, forced draft fans, Vulcan soot blowers, and all accessories.

1—110 ft. fixed radius coal handling crane. Capacity 250 T.P.H.

3—42″ Apron feeders, 30′ centers, Link-Belt.

4—42″ Apron feeders, 10′ centers, Link-Belt.

1—24″ Belt conveyors, 110′ centers, Link-Belt.

2—24″ Belt conveyors, 180′ centers, Link-Belt.

1—24″ Belt conveyors, 225′ centers, Link-Belt.

1—66′ cross section 24″ wide, Link-Belt.

8—24″ Buffalo exhaust fans with motors.

8—30″ Buffalo exhaust fans with motors.

1—Roots Style D high pressure type blower. Capacity 890 cu. ft. per minute at 435 r.p.m.

2—Connersville blowers, double outboard bearing. Capacity 24.5 cu. ft. per rev., 3,200 cu. ft. per minute at 255 r.p.m.

5—2½″ American Type A, belt driven centrifugal pumps.

25—4″ Baker belt driven centrifugal pumps.

75—5″ Gould belt driven centrifugal pumps.

24—6″ Baker belt driven centrifugal pumps.

5—14″ Worthington Class B centrifugal pumps, direct connected to motor.

4—14″ Allis-Chalmers Type S, centrifugal pumps direct connected to turbine.

6—16″ Allis-Chalmers Type S, direct connected to turbine.

12—Welded steel autoclaves, 300 lbs. pressure, tested to 1,000 lbs.

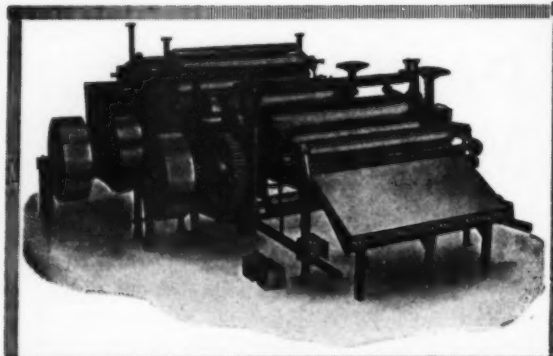
Transmission, cold rolled steel, all sizes and lengths, shaft hangers, all types and sizes. Bearings, capillary, ring, and standard oiling. Pillow Blocks. Friction clutches, dodge, split, solid, and jaw. Collars, solid, split, and thrust. Pulleys, split and solid, cast iron and steel.

This equipment can be purchased cheap
Write for prices and specifications

Nashville Industrial Corporation

Purchasers of Old Hickory Powder Plant

OLD HICKORY, TENNESSEE



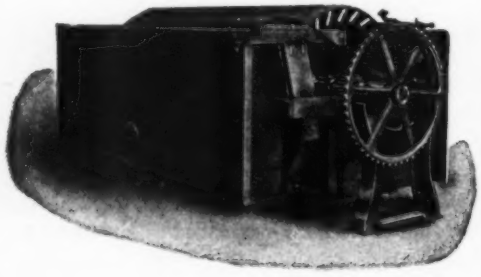
Rogers and Special Wet Machines

SINGLE AND DOUBLE PRESS
FOR CONVERTING CHEMICAL PULP INTO SHEETS 48% DRY

25-30 TONS air-dry pulp per 24 hours. Built in 72" width only, with patented pulp weakening and separating device or our new automatic knife cut-off attachment.

FREIGHT CHARGES are greatly reduced. Savings on this item alone often pay for the machine in one year.

All infringements will be vigorously prosecuted



The Wood's Machine

Used as Pulp Thickeners, Savealls, Pulp Washers and Water Filters

ADVANTAGES:

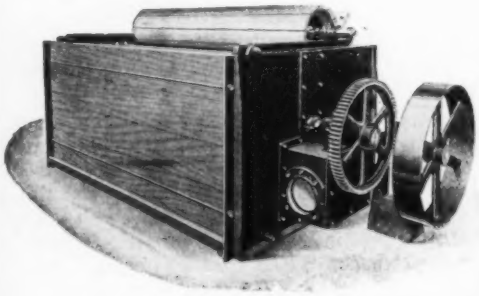
Reduced Wire Costs	No Couch Roll
Enormous Capacity	Minimum Repairs
Only 2 H. P. Required	No Doctor
Works Automatically	Requires No Attention

OVER 150 MACHINES SOLD AND IN USE

Wells Undulating Knot and Sliver Screen

Will bear closest investigation from every angle. It separates knots and slivers from all kinds of pulp efficiently, continuously, automatically with negligible cost for operation and upkeep. Simple but rigid construction. Only best materials used. Operation in plain view.

60 TONS DAILY CAPACITY, STANDARD SIZE. WRITE FOR BLUEPRINT AND FURTHER INFORMATION



Improved Decker

Single or Double Cylinder Type

Built in the following sizes:

Cylinder mould diameter, 36" or 40".

Face of cylinder mould, 72", 84" or 96".

Cylinder mould of best reinforced construction and properly supported with our latest design outside bearings.

Vat furnished either all wood or with cast-iron ends.

For Stability and Efficiency our Improved Deckers are Unexcelled

PULP AND PAPER MILL MACHINERY
GLENS FALLS MACHINE WORKS

GLENS FALLS, NEW YORK

OUR LINE IS MANUFACTURED IN CANADA BY

THE NORTHERN FOUNDRY & MACHINE CO., LTD., SAULT STE. MARIE, ONT.

C. G. McClellan, superintendent of the old plant, will become general superintendent of the paper making department. This includes the new mill. Frank Monahan, superintendent of the new mill has resigned his position, and his successor has not been announced.

The Lee Paper Company, originally incorporated with a capital of $1,000,000, of which $500,000 was preferred and $500,000 common stock, will in September, 1925, retire its outstanding preferred stock, which now amounts to $300,000. The plan meeting with favor among stockholders is to issue 5,000 shares of no par common stock, which will be offered common stockholders at 60, thus obtaining the sum of $300,000 required to take up the preferred stock. This concern has enjoyed excellent business for several years and has been able to operate at close to capacity the major portion of the time.

Use of the village water pumping station which is working day and night at full capacity, has saved the Watervliet Paper Co.'s big plant from a costly shutdown following damage to its pumping system. The plant is using from 150 to 200 gallons per minute of the village's water. The factory, which is making a high grade of book paper, has been running 24 hours daily without once stopping during the winter. This plant specializes in coating, which, at present, they are unable to meet the demand for their product which the jobbers insist on having in preference to other book coating on the market.

Plans for National Convention of Superintendents

Kalamazoo members of The American Pulp and Paper Mill Superintendents' Association are beginning to look forward to the national convention of the organization May 22 and 23, in Dayton, and Middletown, centers of the Miami River district. H. W. Server, of the Miami Paper Company, West Carrollton, Ohio, is general chairman and announces a program covering phases of the paper industry from all angles.

The Corrugated Paper Box Company, Detroit, has filed articles of incorporation with a capital of $50,000. The Company will engage in the manufacture of boxes. The original incorporators are Katheryn F. and Charles G. Green, Detroit, and Harry R. Marien, Redford.

The Bryant Paper Co. has issued a call to purchase $25,000 of its own bonds to place in the sinking fund for retiring those securities. In no case must the price of the securities offered exceed 104 and accrued interest.

The Standard Paper Company of Kalamazoo, Mich., report they have purchased a five-acre tract of land from the Chicago, Kalamazoo & South Bend Railroad Company, on which it is planned to build a new mill.

Europe Interested in Graphic Arts Exposition

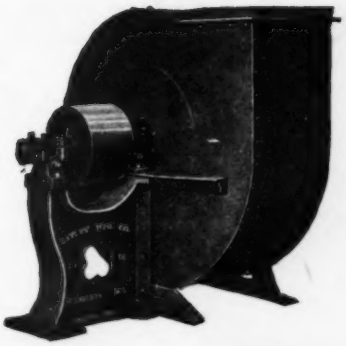
Rudolph Fretz of Fretz Brothers, Zurich, Switzerland, who is in America studying the latest development of printing and lithographing, has expressed much interest in the Graphic Arts Exposition to be held in Milwaukee, August 18 to 23, and has written his firm for authority to take space.

"I have observed several outstanding differences in the manner in which establishments are conducted here and in Switzerland and the rest of Europe," said Mr. Fretz. "You are a country of specialists. In Europe the craftsman learns every phase of his process and is able to perform almost any equally well. As Herbert Hoover expressed it to me, our development is on a horizontal line and yours on a vertical. The same thing holds good in plant management. In Europe the owners know not only of the business and practical end of managing the firm but also the technical side. In this country there are heads of many firms who are not technicians."

He expressed confidence that many European firms would be represented at the exposition and convention of the International Association of Printing House Craftsmen because of the opportunity of seeing under one roof all the latest developments in the industry in America.

"The exposition presents a wonderful opportunity for European firms to see your latest machines and processes with a minimum of effort," said Mr. Fretz.

The number of foreign diplomats and firms which have replied to invitations to be represented at the exposition has increased from 100 to 150. Many have stated they will send representatives, while others are considering the matter.



Exhaust Fan
ECONOMY

Economy in exhaust fans is not measured entirely by a saving that may be made in first cost.

Over a long period in operation the savings that are effected in power costs will save the amount of the investment several times over.

And then — the continuous, dependable operation that is in-built in every Bayley Exhaust Fan must be considered as economy, for it insures against interrupted operation and suspended processes.

For removing dust from rag room, material from chippers, barkers and grinders, Bayley Exhaust Fans will exactly fit every need.

They are sturdily constructed throughout. The blast wheel is of particularly strong design and will easily withstand the shock of oversize material and large chunks of wood.

Investigate Bayley construction before you purchase exhaust equipment.

Bayley

MANUFACTURING CO.
748 Greenbush Street
MILWAUKEE, U. S. A.

The Hidden Costs of Paper Production

The most expert Efficiency Engineer in the World would find it difficult to gauge accurately the actual loss occasioned by the stretching, slipping and breaking of inferior belting.

Every mill operator, however, knows that there is such a loss figured on a basis of power wasted, idle machinery, etc., and does what he can to eliminate it.

By actual experience it has been proved that the Republic Belts designed and made specially for paper mill work, reduce this hidden cost to a minimum.

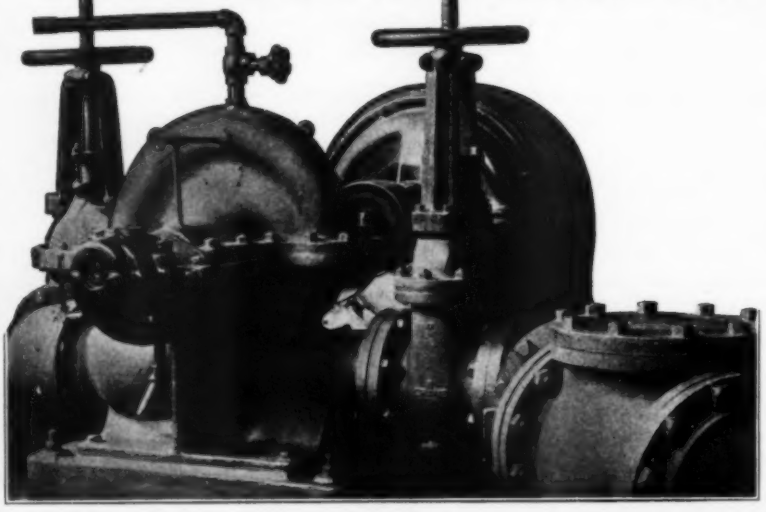
Any paper manufacturer who has ever used Republic Invader or Double Cross Belting will substantiate this claim.

Let Us Serve You

THE REPUBLIC RUBBER COMPANY
Youngstown, Ohio

REPUBLIC BELTING

Performance | Which Means Savings



Pump No. 2014 in a Michigan paper mill was opened for the first time last July after nearly six years' operation to renew the wearing rings and shaft sleeves. The runner did not show any appreciable wear and the only expense up to that time was one set of packing and changing the water seal piping which had become stopped up with algae. Maintenance expense 1¼ percent a year.

Combined Responsibility
With Any Kind of Drive

ALLIS-CHALMERS

MILWAUKEE, WIS. U. S. A.

Ohio News

April 1, 1924.

Superintendents Hold March Meeting

Miami Valley division of the Pulp and Paper Mill Superintendents' Association gathered at the Hotel Manchester, Saturday evening, March 29, for their monthly dinner meeting. Vernon H. Schnee, assistant general manager of the Cleveland Worm and Gear Company talked on "Why Worm Gearing?"

H. W. Server, of the Miami Paper Company, West Carrollton, Ohio, chairman of the general committee which is planning the annual convention of the organization in Dayton, Ohio, in May spoke briefly of plans which are being completed.

Mr. Schnee spoke of the history of the worm gear, saying that Archimedes was the discoverer. "In the eighteenth century," he said, "worm gears were brought into first general use. It was with the development of the automobile in the present century that worm gearing was perfected.

Because of their advance in auto-making, the German and English manufacturers are far ahead of Americans in applying worm gearing," Mr. Schnee continued. "In 1904 the most modern and largest European automobiles were equipped with worm gearing while it was 1911 before Americans knew that worm gears existed. Two Englishmen brought the idea to this country, gained financial backing from Cleveland men, and began seeking means to apply the new gearing to manufacturing in general and to automobiles in particular."

Mr. Schnee emphasized the importance of worm gearing as applied to paper-making machines, saying that 3,000 units have been installed in this country by his company and that all function particularly well on paper machines. The question of lubrication of the worm gear on paper machines was discussed. The gear functions best at a temperature of 168 degrees Fahrenheit, as hot as the hand can stand.

The new Frank Smith Paper mill is equipped with worm gearing, he pointed out.

The superintendents registered at the March meeting were: Homer C. Ferguson, C. A. Kelly, Charles Soule, and F. E. Karls, of the Champion Coated Paper Company, Hamilton; C. A. Miller and John MacMurray, Miami Paper Company, West Carrollton; Adam Ritz, Ohio Paper Company, Franklin; Frank R. Henry, A. A. Simonds and Son, Dayton; H. D. Martindale, C. R. Crawford, Shartle Brothers Machine Shop, Middletown; N. J. Niks, Chillicothe Paper Company; John Calder, Wrenn Paper Company; B. M. Bishop, Tom Harvey, Gardner and Harvey Paper Company; M. Ludwig, Jr., Mead Pulp and Paper Company; H. W. Server, Miami Paper Company, West Carrollton; E. H. Williams, Williams-Gray Company; C. E. Maeser, Green Bay Wire Works; William T. Schenck, Black-Clawson Company, Hamilton; C. E. Fry, Lincoln Paper Company; T. H. Keogh, Dayton; E. W. Keogh, Dayton; Jack Smith, Sr., Gardner-Harvey Paper Company; A. J. Allison, A. A. Simonds and Son, Dayton; L. E. Trotter, the Dingle-Clark Company; G. S. Martindale, Champion Coated Paper Company, Hamilton; L. T. Murphy, Auglaize Box Board Company, Marysville, Ohio.

Property Transfers in Sorg Co.

A transfer of property between units of the Paul A. Sorg Paper Company has been completed with the filing of two deeds with the county recorder in Hamilton. Twenty-two acres of land are involved in one transfer, while the other lists thirteen lots.

The transfers are recorded as follows:

W. B. Oglesby Paper Company to the Frank Smith Paper Company, lots 1704-06.

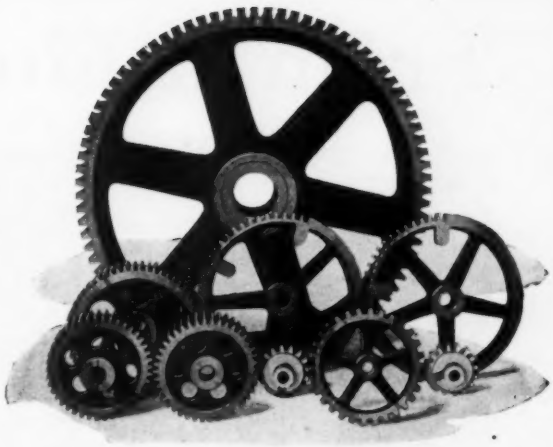
The Paul A. Sorg Paper Company to the Paul A. Sorg Realty Company, 13 lots, $302,000.

J. A. Aull, president of the Paul A. Sorg Paper Company explained the transfers as follows:

"The deed from the W. B. Oglesby Paper Company to the Frank Smith Paper Company represents twenty-two acres of land west of the Oglesby plant, conveying to the Smith Paper Company the land on which the new buildings of the Smith Paper Company are erected, and the vacant land on out to the Miami River.

"The deed from the Paul A. Sorg Paper Company to the Paul A. Sorg Realty Company conveys to that newly organized corporation, which is also a subsidiary of the Paul A. Sorg Paper Company, all of the dwelling houses and real estate in the city of Middletown not required in the operation of the paper company, it being the purpose to separate these holdings from the parent organization.

A waste paper drive, conducted by the Franklin grade schools has been a financial success. Between February 25



Special Purpose Gearing

OUR immense stock of hobs and cutters enables us to make prompt delivery on any of your gear requirements.

If you need one or a thousand—of whatever type—Ganschow Quality Cut Gears can be furnished promptly and to accurate specifications.

If you need quick delivery of replacement gears for an emergency, Ganschow can deliver them.

There is the reflection of 54 years of gear making in each Ganschow Gear. You can't buy better gears, and you can't afford to buy cheaper.

Send for our new Handbook Catalog No. 100. It gives complete information regarding design, installation and care of gearing, and will be sent free to manufacturing executives. PI-106

William Ganschow Company

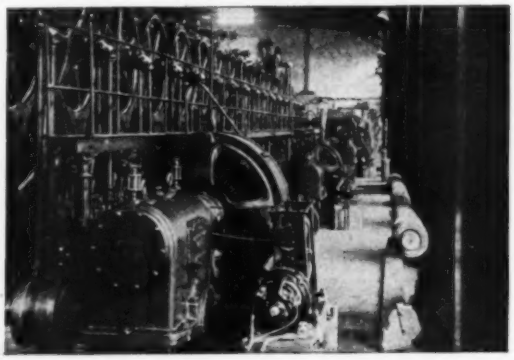
1015 Washington Boulevard Chicago, Illinois

MEMBER OF AGMA

Manufacturers of Cut Gears and Speed Transformers

Ganschow Cut Gears and Speed Transformers

From California to Maine



Paper Machine (Sectional Drive)—Motors—25 to 50 H. P., 275 to 725 R. P. M., Reductions 8-1/5 to 1.

Note the economy in floor space required due the right angle drive, distinctly a Cleveland feature.

Cleveland TRADE MARK C.W.&G.C. WORM GEAR REDUCTION UNITS

THEY are using CLEVELAND WORM GEAR SPEED REDUCTION UNITS in the Paper Industry. Wherever low machine speed is desired a Cleveland can be used in connection with the more economical and more efficient high speed motor.

Dependability and Simplicity are two outstanding Cleveland features in addition to durability and compactness.

There is a Cleveland representative close to you who will gladly give you detailed information—you may have a catalog on request.

The Cleveland Worm & Gear Co.
East 40th Street, CLEVELAND, OHIO

"America's Pioneers in Worm Gearing"

Robert L. Latimer & Co.

24 AND 26 N. FRONT ST. - PHILADELPHIA

Paper and Chemical Plant Equipment

ELEVATING AND CONVEYING MACHINERY
GENERAL MILL SUPPLIES

REX CHAIN

SHAFTING
HANGERS
PULLEYS
BELTING

and March 7, more than twelve tons of paper were collected. The $500 prize was awarded fifth grade taught by Mrs. Laura Farrell. The money for this prize was made up by deducting 33 1/3 per cent of the money obtained by each of the other fifteen rooms competing. The money will be used to beautify the school grounds, purchase flags for several rooms and buy a victrola for the West Side building.

Howard L. Cheney, of Franklin, has purchased the pulp mill of the Srere Pulp and Paper Company of Franklin. Mr. Cheney has been the local manager of the Srere Brothers interests for many years and is qualified to act as manager of the new concern to be known as the Cheney Pulp and Paper Company.

Shipping-Rolls of Paperboard

By James A. Cameron

Not only is the tonnage of paperboard in the form of rolls as compared to sheets increasing, but the sizes of rolls specified by the customer is still another proposition for the producers of board to wrestle with. Where a comparatively few different sizes of rolls were formerly called for, it was a simple matter to rig up for producing them, but now the customer's demands range all the way from ordinary shipping size rolls, say, for instance, 40" wide and 40" diameter, up to rolls which might be 60" diameter and only 10" wide. There is an equally great variety in the kind of core or diameter of hole in the center of the roll. Some customers want their rolls wound on wood slat cores, others on solid wood cores with a square hole, and still others on iron pipe. Others again specify rolls without cores and a hole possibly 3" or 4" diameter.

What is the mill man going to do to get out from under this variety of demands? What he usually does is to accept only such business as he can comfortably handle on the winder he already has, or talk the customer out of his notions as to wanting this or that in the way of excessive diameter, or narrow width, or freak kinds of cores or no cores at all. It is not always feasible to talk the customer out of the preferences he may have. Usually he will keep prowling around until he finds a mill with modern equipment that can produce the kind of rolls he wants, and leave the salesman flat who is trying to sell him what he does not want.

When it comes to shipping the rolls of board, a new difficulty presents itself where the customer demands rolls of extra large diameter, say, for instance, 60" diameter, and also wants them straight and even on the edges, firmly wound and frequently also wants rolls of very narrow width in this large diameter.

A roll which is poorly formed, that is to say, of mushy density rather than firmly wound and also irregular as to the edges, is certainly a mean proposition to handle in shipping, and equally mean for the customer to utilize. A roll irregular as to the edges requires not only that it should be wrapped on the outside, but also that a certain amount of padding should be used on the ends to prevent excessive damage in shipping—and this costs time and money.

Modern methods of winding rolls solve these difficulties. Not only do they cover the difficulties of producing the rolls, but also minimize the expense of preparing same for shipment.

It is a matter of arithmetic, and a simple one at that, for the average mill man to figure how much he has already invested in mill equipment, including land, buildings, machinery, etc., to actually make the board; and to figure whether the additional investment of possibly one-half of one per cent of this amount in a thoroughly up-to-date slitting and roll-winding machine, would not be a good proposition; especially as the saving of such a machine in the production of rolls at the minimum of operating cost and broke, combined with the saving in shipping difficulties and expense, would probably save the cost of the machine within half a year. That is easy enough to figure.

But there is another factor in favor of modern roll-winding equipment, and that is that the mill having it will gradually come to have the preference of the customer utilizing board in rolls.

Forest Protection Week; April 21 to 27

President Coolidge has designated April 21-27, inclusive, as the 1924 Forest Protection Week.

The President in his proclamation will urge "all governors and all citizens, either in association or as individuals," to make proper observance of the week.

One Man Unloads 50 Tons of Coal In 90 Minutes For $3.50

In most cases, that is the maximum cost of handling coal with the **Godfrey Conveyor** from hopper-bottom cars to boiler room and outside storage. In many instances, this operation is performed at a cost of three cents a ton.

There are perhaps more installations of **Godfrey Equipment** in the paper industry than in any other industrial field, because that's where it shows one of the biggest savings.

We can refer you to paper mills, both large and small, where **Godfrey Conveyors** are paying substantial dividends and it will pay you to investigate this proposition.

Ask for Bulletin A-1

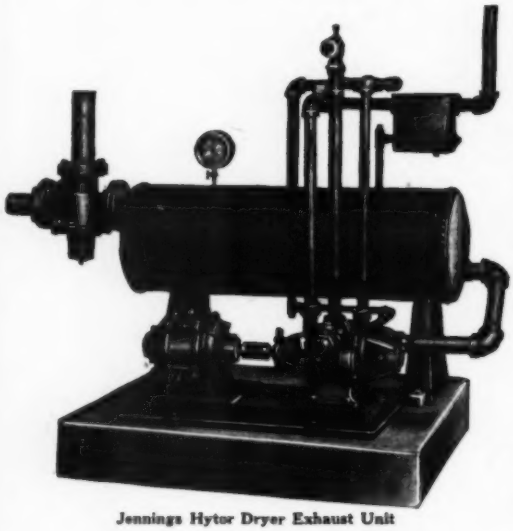
GODFREY CONVEYOR COMPANY
Elkhart, Indiana

Godfrey Conveyor at Monroe Paper Products Co., Monroe, Mich.

Godfrey CONVEYORS

Most Efficient Economical System for Handling Condensate from Dryers

—FIRST COST PRACTICALLY THE LAST—



Jennings Hytor Dryer Exhaust Unit

This system comprises the **JENNINGS HYTOR DRYER EXHAUST UNIT** and the **ARMSTRONG STEAM TRAP. with MY SPECIAL ARRANGEMENT OF PIPING,** an Armstrong Trap being installed on the return line from the condenser dryers with the main return header connected directly with the Jennings Unit, thus insuring circulation and highest efficiency of dryers.

A number of mills are using this system very satisfactorily.

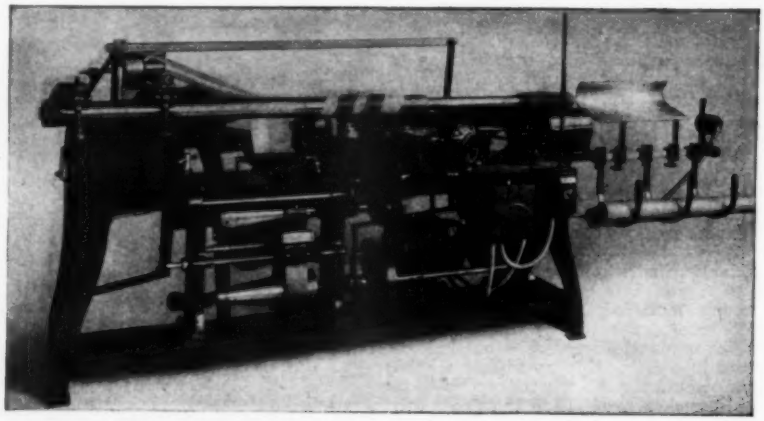
Full Particulars on Request by Addressing

Armstrong Steam Trap

THOMAS H. SAVERY, JR.

Suite 1524 Republic Bldg. **Chicago, Illinois**

Making Paper Tubes and Cans



Perfect Tubes at High Speed

For whatever purpose Paper Tubes are desired, this Knowlton Spiral Tube Machine will be found just what is required.

It produces tightly wound tubes and cuts them clearly at high speed.

To insure better cans and greater profits, make your tubes on a

KNOWLTON

M. D. KNOWLTON COMPANY, Elizabeth and Industrial Sts., Rochester, N. Y., U. S. A.
New York—203-205 Wooster St. Chicago—856 West Adams St., corner Peoria St.
London E. C., Eng.—23 Goswell Road. Cable Address, "Stayer, Rochester," A. B. C. Code

Northern New York News

April 1, 1924.

Yaleville Mill of Martin Bros. Completed

The Martin Brothers, sons of the late O. E. Martin, of Norwood, one of the pioneer paper manufacturers of St. Lawrence county, have just completed a new mill for the manufacture of tissue paper at Yaleville. The mill has been in course of construction since the fall of 1922 and the first machine installed started up for a trial in the middle of March with favorable results. The mill is owned by the Martin Pulp and Paper Co.

The plant consists of a beater room 31x72 feet, machine room 132x60, boiler room 30x48, and coal pit 30x20 feet. The basement is 12½ feet high and the machine room 20 feet. Three hundred tons of steel were used in the construction.

The mill is equipped with two 1,000-pound Horne beaters, a Noble & Wood Jordan and a 94-inch single cylinder Bagley & Sewall tissue machine. The machine is speeded to manufacture 425 feet of tissue per minute, which will mean about five tons of nine-pound tissue every 24 hours. The power is directly connected twin cylinder variable speed engine, connected to two boilers of 150 horsepower each.

Sends Daily Train of Paper to N. Y. C.

Evidence of the prosperity of the paper mills in this section is contained in the announcement by the New York Central Railroad Co. that paper shipments from the St. Lawrence division have shown substantial increases in the last few months.

A train made up of from 40 to 80 carloads of paper for the metropolitan dailies leaves the Watertown yards at Watertown each morning, reaching Weehawken, N. J., at 4:30 the next morning. During recent weeks the train has run more than 50 cars nearly every day, and at frequent intervals reaches the top figure of 80 cars. The train, established by the New York Central a year ago, has proved of great value to the paper trade. A big part of the daily shipment is newsprint made in the mills in the vicinity of Watertown, but shipments from mills in all parts of northern New York are included. At present a considerable amount of Canadian paper is being received on the St. Lawrence division for forwarding to New York and other points.

Algonquin Breaks World's Production Record

Records for one day's production by a paper machine were broken recently by the 204-inch machine of the Algonquin Paper Company of Ogdensburg, installed by the Bagley & Sewall Company of Watertown. The machine trims a sheet 194 inches wide and in a 23-hour run one day during March produced 96 tons of standard newsprint, running at a rate of 760 feet a minute. The machine is one of the largest in the country and has been in operation about nine months.

Engineers of the Bagley & Sewall Company who keep careful track of records say that no machine in the United States or Canada has ever equalled the record of 96 tons production in one day. The record is believed to hold good for the world also.

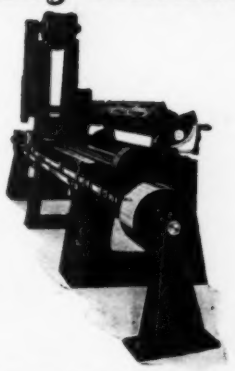
Sisson Appointed Member of Forest Research Council

George W. Sisson, Jr., president of the Racquette River Paper Co. at Potsdam, has been appointed by Secretary of Agriculture Henry C. Wallace a member for a term of four years of the Forest Research Council, a body organized to act in an advisory capacity to the Northeastern Forest experiment station at Amherst, Mass., and to other forest research agencies through New England and New York state.

The council is expected to stimulate and guide research and it is hoped that its recommendations will lead to the adoption of a more comprehensive, better co-ordinated and more effective program of forest research than now exists.

Wood pulp for the manufacture of Kraft paper at the Battle Island plant of the Arrowhead Mills, Inc., at Fulton, may come this year direct from Sweden to the port of Oswego by way of the St. Lawrence river, according to plans now being discussed by the paper company. The Swedish exporters of pulp for Kraft paper are anxious to put their product into a Swedish steamship and send it to Oswego with the cargo for transshipment to Fulton, only a short distance away, either through the barge canal or by rail. Products manufactured in Fulton and Oswego would be carried back to Europe in the Swedish ships.

Improved Paper Knife Grinding Constructions



Mammoth Traveling Cup Wheel Knife Grinder for Veneer, Paper, Planer, Hog and Cotton Seed Oil Knives, Shear Blades, Etc.

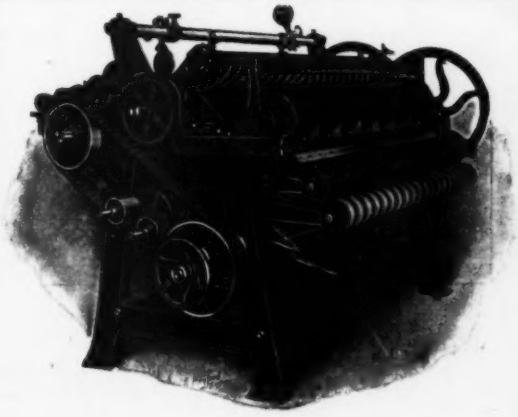
Full Automatic Longer Life Less Space Less Wear Fewer Parts

Our new machines represent the highest development ever reached in fitting paper knives with full automatic machine tool precision. Half the floor space of the older type grinders.

Write for illustrations and prices of our latest developments for paper knife grinding.

Machinery Company of America

Big Rapids, Mich., U. S. A.



PAPER CUTTERS

Single, Duplex, and Diagonal

CUTTER KNIVES

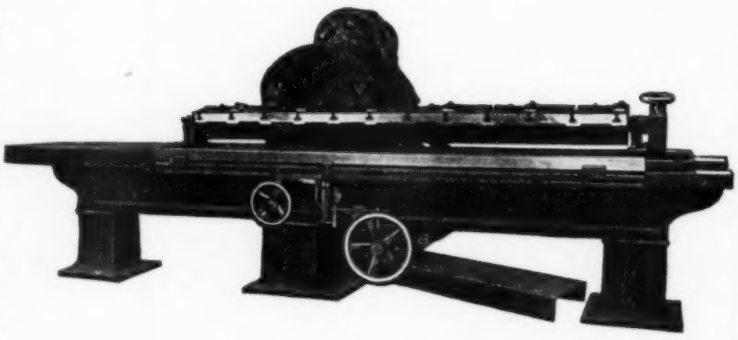
PATENT TOP SLITTERS

Hamblet Machine Co.

LAWRENCE, MASS.

Do Your Paper Knives Cut Clean?

They will, if properly ground. This depends on the Knife Grinder, the Grinding Wheel and the Operator. We cannot supply the Operator, but we can furnish the Knife Grinder and Grinding Wheel which will grind your knives true and not draw the temper.



THE "BRIDGEPORT SAFETY" SECTIONAL WHEEL KNIFE GRINDER is doing this today for large paper and pulp mills. The "Bridgeport Safety" Grinders not only grind true when the machines are new, but after years of service good results are obtained, for the machine is strong and rigid and adjustable for wear. THE SECTIONAL GRINDING WHEEL reduces power consumption to a minimum and gives a maximum of service. The experience of paper mill men is that the machine is ideal for the service. May we tell you more? Our catalog is yours for the asking.

BRIDGEPORT SAFETY EMERY WHEEL CO.

102 Knowlton Street BRIDGEPORT, CONN.

Fiber Cores and Centers for All Winding Purposes

(Send us specifications or samples. We can meet your requirements. We have unusual facilities)

SONOCO PRODUCTS CO., *Manufacturer*

HARTSVILLE, SOUTH CAROLINA

Algonquin to Add New Wet Mill

As soon as weather conditions permit the Algonquin Paper Corporation of Ogdensburg will begin the erection of a wet mill near the present plant. The present ground wood mill is not large enough to keep pace with the capacity of the paper mill, which may soon be turning out 100 tons of newsprint paper for the Hearst organization a day.

The new wet mill will be about 200 feet long. It will be built of reinforced concrete.

Preparations are being made at the pulp terminal at Waddington for the largest season in its history. Last year there were only two cargoes of pulp unloaded at the docks there, due to the blowing down of the carriers by the wind on two different occasions. The carriers have been rebuilt and a number of boats have been put under contract to carry the wood, thus insuring a steady supply. The wood is hauled by train to the mills of the St. Regis and Hanna mills at Norfolk, Raymondville and Norwood.

The $300,000 bond issue of the Black River Regulating District for the enlargement of the Stillwater reservoir were sold last month to George B. Gibbons and Company of 40 Wall Street, New York, the bid being $103.77. The reservoir enlargement will increase the flow in the Black and Beaver rivers, benefiting principally the paper industry of northern New York. Cost of the project is being borne largely by the paper industry.

The New York Central railroad has granted a reduction in the freight rate on wood pulp between New York and Watertown from 25 cents per hundred to 23 cents. The reduction, which was brought about by the traffic committee of the Watertown chamber of commerce, will mean an annual saving of $8,000 to the mills in Watertown and immediate vicinity alone, in addition to the saving to other mills of northern New York.

L. B. Steward, who a few years ago was general manager of the St. Regis Paper Co. of this city, was recently appointed general manager of the paper and pulp mills of the Bayless Manufacturing Co. at Austin, Pa. For several years Mr. Steward was secretary of the American Paper and Pulp Association, and has been identified with several paper wholesalers and manufacturers.

Fred H. Fuller, one of the best known paper makers of this section, has left for Vancouver, Wash., to become superintendent of the new mill of the Columbia River Paper Co. A Bagley & Sewall paper machine is now being installed there. Mrs. Fuller and their daughter, Maryan, will remove to Vancouver as soon as their home here is sold.

The Northern Paper Products Co., which owns a tract of 500 acres of forest land near Star Lake, St. Lawrence county, will set out 300,000 second year Norway pine trees this year. A larger number of plants of a year's growth will be transplanted to be ready next year for permanent transplanting.

Richard Gray, representing the Bagley & Sewell Company of Watertown is in Vancouver, Wash., setting up a new 136-inch machine for the Columbia River Paper Corporation. The machine will be the first unit in a new mill. A sulphite plant has been in operation about three months.

S. A. Upham was re-elected president of the Brownville Paper Co. at the annual meeting of the board of directors March 11. D. M. Anderson was elected vice president, G. F. Clark secretary and treasurer, and James L. Lingenfelter, assistant secretary and treasurer.

Production at the Knowlton Bros. Co. paper mill was curtailed about 40 per cent for a week in March when a 100-inch flywheel weighing two and a half tons broke. No one was injured and no serious damage was done.

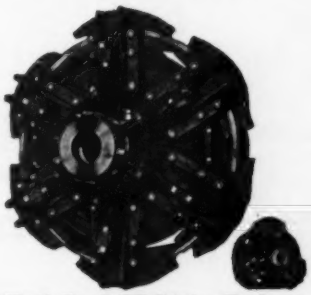
The John A. Manning Paper Company of Troy, N. Y., are erecting a paper machine in their new building at their Green Island mill. This will make their third machine. They expect to start up by June 1st.

The Saranac Pulp & Paper Company of Plattsburg, N. Y., are now erecting a new paper machine in their new plant. They expect to start operating in about 60 days.

The National Industrial Conference is to make a study of engineering education in the paper industry.

"HILL CLUTCH"
MILL EQUIPMENT

YEARS OF SERVICE AT FULL EFFICIENCY—NOT THE FIRST COST, ARE THE TRUE TEST OF FRICTION CLUTCH ECONOMY



"Smith Type" Hill Friction Clutch cut-off couplings (patented)

The "SMITH TYPE" HILL CLUTCH is a safe and practical investment that pays dividends.

When the load is applied, this clutch can be depended upon to *"stand the gaff."*

Designed along correct mechanical lines.

Frictional contact 100% effective.

Lots of reserve power. Built in 20 sizes from 9 to 1300 H.P. at 100 R.P.M.

Install the "Smith Type" Hill clutch for economical operation of prime power units, individual machines, sections of shafts, or group drives.

The Hill Clutch Machine & Foundry Co.

General Office and Works
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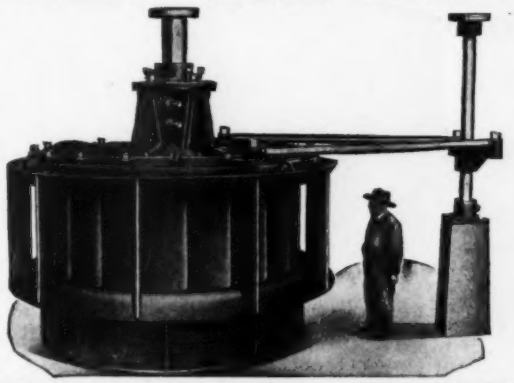
LEFFEL
TURBINE WATER WHEELS



HIGH SPEEDS, HIGH POWERS, HIGH EFFICIENCIES

All of our turbines are designed and built to suit location and requirements, by engineers and experts who have had years of experience in this particular line of work. Turbines fully guaranteed.

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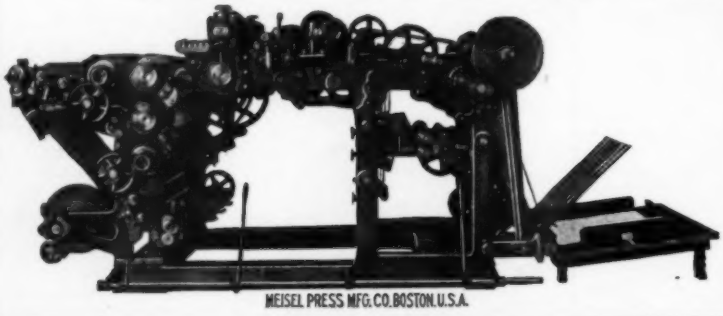
PETERBOROUGH, ONT., CANADA ... William Hamilton Co., Ltd.

JUST ONE OF THE MANY



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Takes paper from the roll.
Prints and numbers on both sides.
Slits the web, cuts off the paper into sheets.
Accumulates 5 sheets and delivers to a table by fly and jogs.
Used for Bills of Lading, or other products.
We have other types if this one does not meet your requirement.

MEISEL PRESS MFG. CO.
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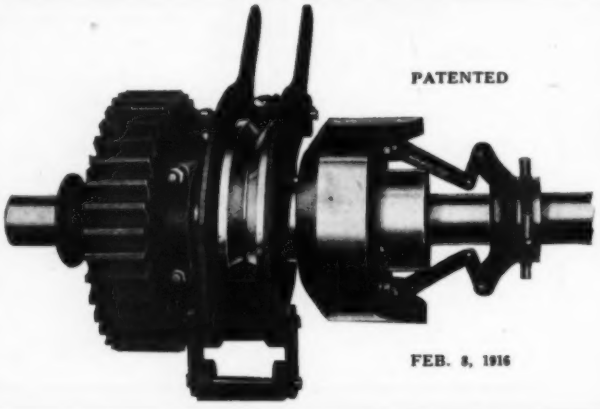

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For Positive and Accurately Stopping

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Clutches for All Transmission Purposes

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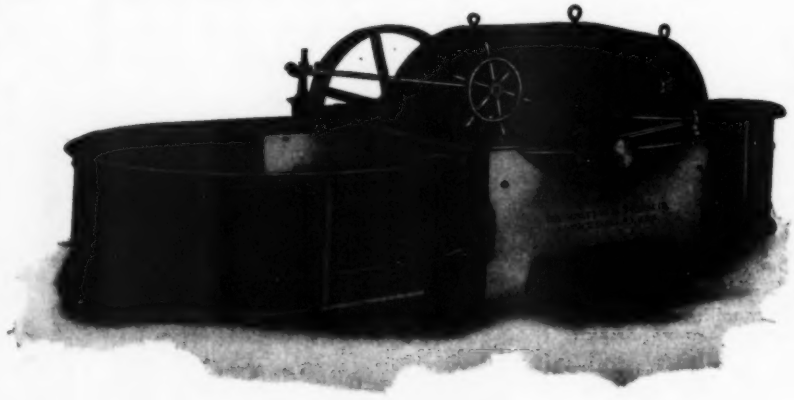


Better Beaters *By* Comparison

Only by comparison can the true worth and merit of an article be judged.

By comparison, point for point, Noble & Wood beaters are stronger, and heavier.

THE NOBLE & WOOD MACHINE CO.

HOOSICK FALLS, NEW YORK, U. S. A.

Built in Canada, by the Port Arthur Shipbuilding Co., Ltd., Port Arthur, Ontario

New York City News

New York, April 1, 1924.

Cherrie to Represent Castle & Overton, Inc.

About April 15, Fred S. A. Cherrie will leave New York for Chicago where he will establish an office to represent the firm of Castle & Overton, Inc., importers of and dealers in wood pulp, cotton rags and other paper manufacturing materials of 200 Fifth Avenue, New York. Mr. Cherrie has leased offices in the new south section of the Wrigley Building, Room 464, in Chicago, and from this office he will cover the entire Middle West for Castle & Overton, Inc. Fred Cherrie has been prominently identified with the paper stock trade for 26 years, and is widely and favorably known throughout the trade, particularly among paper manufacturers in the Middle West where he has traveled extensively in recent years. He started as a boy with the former concern of R. H. Overton & Son, which in 1901 was merged into Castle, Gottheil & Overton, and which firm was changed to Castle & Overton two years ago on the death of Leon Gottheil, and incorporated under the revised name early this year. The departure of Mr. Cherrie from New York means that this city loses and Chicago gains one of the most popular salesmen in the paper mill supplies trade.

Charles E. Robertson, for the last five years with the Whiting-Patterson Company, paper merchants and importers of 265 Canal Street, New York, has joined the sales staff of A. R. Melker, of 110 East Forty-second Street, New York. Mr. Melker is metropolitan representative of the Ajax Paper Mills, the J. P. Lewis Company, the Franklin Coated Paper Company and the Unity Paper Mills.

The partnership between George R. Kelsey, Raymond E. Risden and Robert S. Cooper, doing a paper jobbing business under the firm name of Kelsey, Risden & Cooper at 156 West Broadway, New York, has been dissolved by mutual consent. Messrs. Kelsey and Risden have purchased the shares of Mr. Cooper and will continue the business.

Fred Enders, manager of the wood pulp department of Bulkley, Dunton & Company, 75 Duane Street, New York, sailed on the steamer Olympic, March 22, for a business trip abroad. Mr. Enders will be away about two months, and during his absence V. R. Hann has the pulp department in charge.

Paper bag salesmen of Greater New York have organized a trade association to be known as the Allied Salesmen Association. Edward Landers, of the Federal Match Company, is president; Ben Kohn, of the Continental Paper and Bag Mills, treasurer, and Samuel Hoffman, of Schorsch & Company, secretary.

James Rosenberg, formerly president of the American Woodpulp Corporation, 347 Madison avenue, New York, which concern recently went into bankruptcy, is now associated with M. Gottesman & Company, Inc., wood pulp importers of 18 East Forty-first Street, New York.

The Wilson Paper Stock Company, among the largest packers of waste paper in New York, has leased another packing house at 228 West Houston Street, containing 16,000 square feet of floor room, which will enable the company to greatly increase its output.

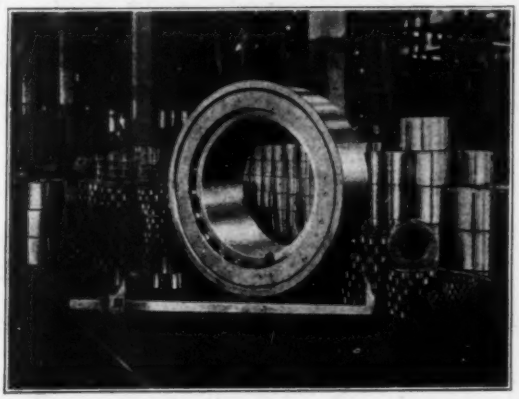
Owen Shepherd, treasurer of the International Paper Company, has been elected treasurer, director and a member of the finance committee of the Continental Paper & Bag Mills, which concern is controlled by the I. P. Mr. Shepherd succeeds Chester W. Lyman, who resigned.

L. B. Steward, at one time secretary and treasurer of the American Paper and Pulp Association, and widely known in the paper trade, has just been appointed general manager of the Bayless Manufacturing Corporation, paper manufacturers with mills in Austin, Pa., and offices in New York City.

F. H. Luning, dealer in paper manufacturers' supplies, has removed from 436 Canal Street, New York, to 592 Smith Street, Brooklyn, where he has an up-to-date warehouse and offices for the grading and packing of rag stock and other materials.

Contract was recently let to Fred L. Smith of New York

THE HART BEARING

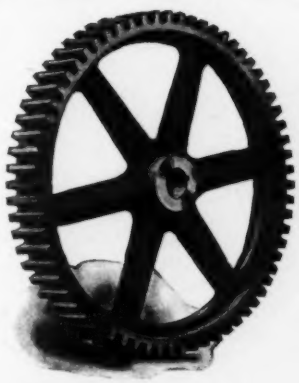


If you have bearing troubles we are prepared to help you. Nothing too large or difficult. Our bearings are standard and extensively used in paper machinery.

Let our engineers solve your problems.

The Orange Bearing Co.
ORANGE, N. J.

GEARS



Why not eliminate your gear troubles by use of POOLE GEARS?
No matter how large or small your requirements may be we can serve you.
16,000 patterns—all kinds.
A skilled organization of 81 years' experience.
Facilities to render unequalled service—rush orders given special attention.

Catalog?

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BALTIMORE MD.
Gear Makers Since 1843

Briner Economizer at Kalamazoo Vegetable Parchment Co. Supply Apparatus located in basement

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BE INSTALLED IN CONNECTION WITH YOUR PRESENT HEATING APPARATUS TO UTILIZE THE WASTE HEAT FROM THE PAPER MACHINE VENTILATORS.

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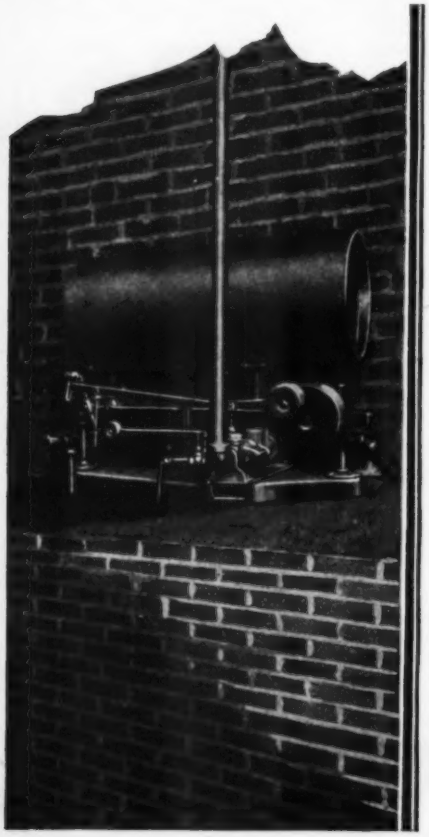
John Waldron Corporation

New Brunswick, N. J.



Is Your Condensation Running Wild?

Does it clog your paper machines, dryers and evaporators? Then your operating costs and fuel bills are too high and your equipment is not delivering its full measure of work. You're losing money.

Let a Morehead Back-to-Boiler System put an end to the waste. It will drain the condensation **as it forms,** keeping your steam lines, coils and spaces clear and dry. Temperatures will rise from boilers to exhaust and production will show a decided jump. The condensation can be returned to the boilers—without pumps—at practically the same temperature at which it condensed, saving the heat units above 212°.

Let Morehead steam drainage specialists confer with you. Correspondence is invited.

Morehead Manufacturing Co.
Dept. O, Grand River at Warren
Detroit, Mich.

No. 126

Morehead
"BACK-TO-BOILER-SYSTEM"
POSITIVELY DRAINS ALL TYPES OF STEAM APPARATUS, DELIVERS CONDENSATION AND FEED WATER TO BOILERS UNDER ALL CONDITIONS AT MAXIMUM TEMPERATURE

City for the construction of a one-machine mill for the Lowe Paper Company of Ridgefield Park, N. J. The foundation has already been started. They will make coated paper.

The MacAndrews & Forbes Paper Company of Camden, N. J., are putting up a new mill. The building is completed and machinery is being installed and operations are to be commenced in July or August.

The Bishop Paper Company, jobbers of 541 Pearl Street, New York, announces that J. W. Haraux, long known in the paper trade as an executive, is now associated with that company as an officer and a director.

Atterbury & McKelvey, importers of and dealers in wood pulp and other papermakers' supplies, have moved from 145 Nassau Street to more commodious quarters at 11 Broadway, New York, where they occupy Suite 501-2.

S. W. Dunning, paper manufacturers' agent, has moved his offices from 132 Nassau Street to 150 Nassau Street, New York. Mr. Dunning was located at the former address for 25 years.

New Catalogs, Booklets, Etc.

CLARAGE FAN CO., Kalamazoo, Mich.—A new booklet describing their Type "V" Air Washer, a product for installation wherever it is essential to have air, which is clean and at a proper humidity.

AMERICAN SOLE & BELTING LEATHER TANNERS, Inc., New York City.—"Nothing Takes the Place of Leather," an interesting booklet on the romance of leather and its importance to mankind.

CHAS. T. MAIN, Engineer, 200 Devonshire St., Boston, Mass.—"Dyehouses," a booklet describing an engineering service for the construction of dyehouses with particular reference to the atmospheric conditions and economy of operation.

PENNSYLVANIA CRUSHER COMPANY, Stephen Girard Bldg., Philadelphia, Pa.—"Pennsylvania Hammer Crushers," an illustrated bulletin describing cement-rock and limestone crushers.

CAMERON MACHINE CO., 61 Poplar St., Brooklyn, N. Y.—A direct mail broadside describing their slitting and roll-winding machines.

GRISCOM-RUSSELL CO., 90 West St., New York City.—Bulletin No. 1216, describing the U-fin Air Cooler to be used for cooling the air from generator windings by the use of turbine condensate.

COMBUSTION CORP., Combustion Engineering Bldg., Broad St., New York City.—"Quinn PGS Burner," a pamphlet describing a new type of oil burner, and "CEC Air Heater," a pamphlet describing a plate type of heater which has demonstrated its ability to increase furnace efficiency through the recovery of a portion of the heat ordinarily lost in flue gases.

TIDE WATER OIL SALES CORP., 11 Broadway, New York City.—"Power Plant Lubrication," a treatise covering the latest developments in the lubrication of power plant machinery.

THE BORDEN COMPANY, Warren, O.—A folder describing the new 106, 108 and 112 Beaver Pipe Cutters.

AMERICAN ENGINEERING STANDARDS COMMITTEE, 29 W. 39th St., New York City.—A small but interesting book entitled "Standardization—What It Is Doing for Industry." This describes how standardization is being carried on, first in the individual plant, second in industry as a whole, third nationally on an interindustrial basis, fourth and last, internationally.

F. L. SMIDTH & CO., 50 Church Street, New York City.—"The Lenix Drive in the Paper Industry," a leaflet on the Lenix Belt Drive, published for distribution at the Second Paper Industries Exposition, recently held in New York City.

WESTINGHOUSE ELECTRIC CO., East Pittsburgh, Pa.—"Static Condensers for Power Factor Correction," a new 20-page circular on the question of high power factor.

YALE & TOWNE MFG. CO., Stamford, Conn.—A new catalog on chain blocks, electric chain hoists and trolleys, known as catalog number 21-M.

The Chicago Belting Company announce that they are now represented in Louisville, Ky., and surrounding territory by the Lowler Machinery Co., of Louisville.

For Water and Air Pressures

FOSTER "Class U" Pressure Regulator

Designed for service on WATER and AIR (under certain conditions). Sizes ½" to 12" inclusive.

Renewable Seats. Compact and self-contained. Absolutely reliable. Install in any position. Gives an even, steady delivery pressure, whether the delivery lines are open or closed.

FOSTER ENGINEERING CO.
109 Monroe St., Newark, N. J.

Pickles' Patent Automatic Steam Regulator FOR Paper Making Machines

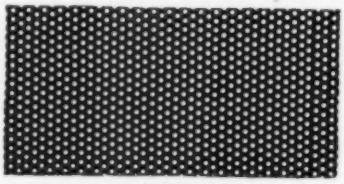
Which absolutely control the drying of the sheet. Installed on sixty days' trial

W. F. PICKLES **Buckland, Conn.**

The Stickle system of removing air and condensation from the dryers, combined with the Stickle automatic control of steam, will produce a more uniform dried sheet with less steam consumed than can be done with any other equipment. We will guarantee this under a competitive test.

Stickle Steam Specialties Co.
Indianapolis, Ind.
New York Office: 46 East 41st Street, New York
Boston Office: 52 Sudbury Street

Perforated Metal Screens for Pulp and Paper Mills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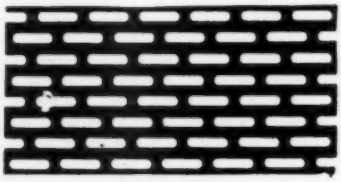
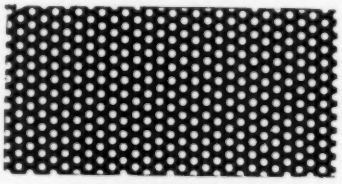

1/8 x 1/2" Slots


3/32 inch round

Steel, Copper, Brass, Bronze and other alloys punched for Centrifugal and Rotary Screens, Pulp Washers, Drainer Bottoms, Filter Plates, etc.

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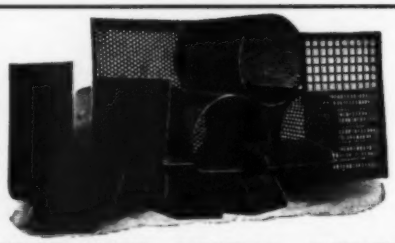

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in all metals for pulp and paper mills
Elevator Buckets (Plain and Perforated)
Conveyor Flights and Trough
General Sheet and Light Structural Work
Light and Heavy Steel Plate Construction
Write for perforated metal handbook

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SCREEN PLATES *and* DANDY ROLLS

Watermarking a Specialty

Central Manufacturing Co.

The Quick Service House

KALAMAZOO MICHIGAN

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WM. A. HARDY & SONS

FITCHBURG, MASS.

Originators and Oldest Manufacturers

OF THE

Cast Bronze Screen Plate

ALSO SPECIALIZE IN

Acid Resisting Digester Parts

UNION SCREEN PLATE CO.

Fitchburg, Mass., U. S. A. Lennoxville, P. Q., Canada

UNION BRONZE SCREEN PLATES

(Best phosphorised Cast Metal)

Old Plates RECLOSED and RECUT to accurate gauge
UNION BRONZE SCREWS for Screen Plates
Immediate Delivery of the Largest Orders. Satisfaction Guaranteed

The Witham Screen Plate Fastener, Patented

THE ORIGINAL THE BEST

LOCKPORT, N. Y. NIAGARA FALLS, ONT.

F. W. ROBERTS MANUFACTURING CO.

All Products Guaranteed to Suit You

STEEL SHELL BURRS YELLOW JACKET SHOWER

Read the "ROBERTS IDEA"

New England News

April 1, 1924.

Says the Boston Federal Reserve Bank of New England: Paper manufacturing conditions during March "Markets showed increased stability and the seasonal increase in paper demand was normal. Buying was reported to be on the basis of current needs." This pretty well described the situation as to the sort of buying that is currently going on in paper, but it is difficult to subscribe to the view of increased stability in the market. As a matter of fact the paper industry in this territory has suffered from depression during the past three weeks as has practically every other line of production. The Federal Reserve Bank's own figures for employment conditions indicate this. For the paper industry in New England they show 2.4 per cent increase in employment in February over January and a loss of double that amount in March. The coal market, which is an excellent indicator, was never so weak. Despite an increase in barge rates on New River coal from West Virginia to Boston the price of coal sagged sharply late in March to a low point of $5.50 on cars Boston.

Protest Expected Against Reduced R. R. Rates on Pulpwood

A reduction on certain import pulpwood rates is bound to bring itself into sharp conflict with domestic pulp manufacturers in New Hampshire, Massachusetts and Maine. The reduction was announced in Supplement 10 to Boston & Maine I. C. C. No. A 2490. It applies on woodpulp from Boston, Mass., imported from Hoosac and Mystic Wharves to Arrowhead, Frankfort and Little Falls, N. Y., establishing a rate of 21½ cents per hundred pounds against a rate of 25 cents for local shipment. From Mt. Tom, Mass., to these points and from Berlin, N. H., the rate is 25 cents, and vigorous protest is expected against these low import rates from the producer at the domestic points named.

It is noted, however, that when Section 28 of the Merchant Marine Act is put into effect in May most of the pulp arriving at Boston as it does in foreign vessels will be forced to move at the local rates of 25 cents, the 21½ cent rates thereafter being applicable only on pulp brought in American vessels.

Boston Paper Trade Association

Social events of the month that were of chief interest included the annual meeting and banquet of the Boston Paper Trade Association at the Algonquin Club, Boston, on Thursday evening, March 20th.

Officers elected for the following year included William B. Stevenson to succeed John A. Andrew as president; Norman Harrower, first vice president, and Joseph D. Snell as second vice president. Secretary is to be F. Bendell Tracy of the Fort Hill Paper Co.; treasurer, T. Harry Casey.

The only note of regret in an otherwise splendid evening of entertainment was the absence of William F. McQuillen, a national figure in the paper trade, treasurer of A. Storrs & Bement Co., who recently fractured arms and legs in a fall on a Boston street crossing. Speakers of the evening included Governor Channing H. Cox of Massachusetts and Professor I. W. Bullock of Harvard.

Reparations Awarded to Ryegate Paper Co.

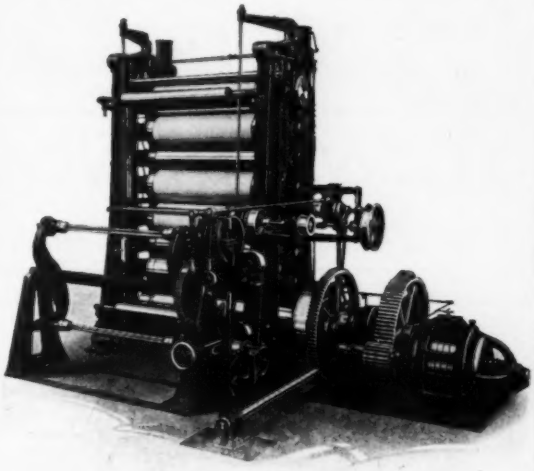
Announcement has been made by the Interstate Commerce Commission of an award of reparation to the Ryegate Paper Co., printing paper manufacturers of East Ryegate, Vt.

The case, which involved an international rate on woodpulp from Quebec to East Ryegate, was attacked as unreasonable in a hearing at Boston before an I. C. C. examiner. The Boston & Maine Railroad denied jurisdiction of the commission, inasmuch as the rate was international in character. The commission in reply cited certain decisions involving such rates, including one applying to shipments of the United Paper Board Co.

The rate assailed was 25 cents per hundred pounds and reparation was asked for two years' shipments on the basis of 21½ cents per hundred, and such was granted.

Possibly one of the most encouraging reports from the viewpoint of domestic merchant pulp producers, that is, pulp mills making an excess for the general market, was the statement given to stockholders at the annual meeting in Boston of the Eastern Manufacturing Co. President Stuart W. Webb says that all plants, including the pulp mills, are now operating at capacity, and have been since January 1. In view of

NORWOOD
SUPER CALENDERS



WE ARE SPECIALISTS IN
Paper Finishing Machinery
NORWOOD ENGINEERING CO.
FLORENCE, MASS., U. S. A.

Notice the heavy ship channels, pressed steel tire and gear saddles securely riveted to the channel sections and the substantial construction of the tires and gears in this Paulson Barking Drum. Is it any wonder that they stand the test? If interested in barking drums now, write us. You'll be satisfied with a Paulson drum.

MANITOWOC ENGINEERING WORKS
"Digester Makers Since "91"
Manitowoc, Wisconsin

IF WE CAN MAKE RUBBER PRESS ROLLS

[SNAPPY AND TOUGH]

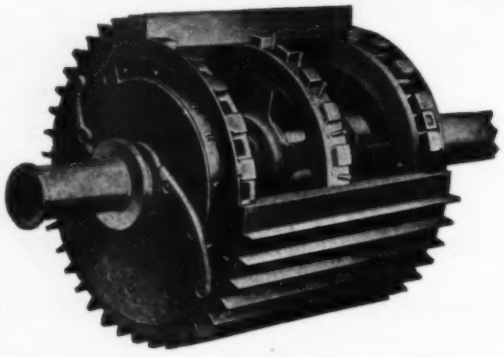
THAT TAKE MORE WATER OUT
THAT ARE EASIER ON THE FELTS
THAT STAND UP BETTER BETWEEN GRINDING

Than what you are using, it would pay to send your rolls to us if we were three thousand miles away. Some mills are doing this.

STOWE & WOODWARD COMPANY

The Rubber Roll Makers

NEWTON UPPER FALLS, MASS.



Dayton Globe Iron Works

DAYTON, O.

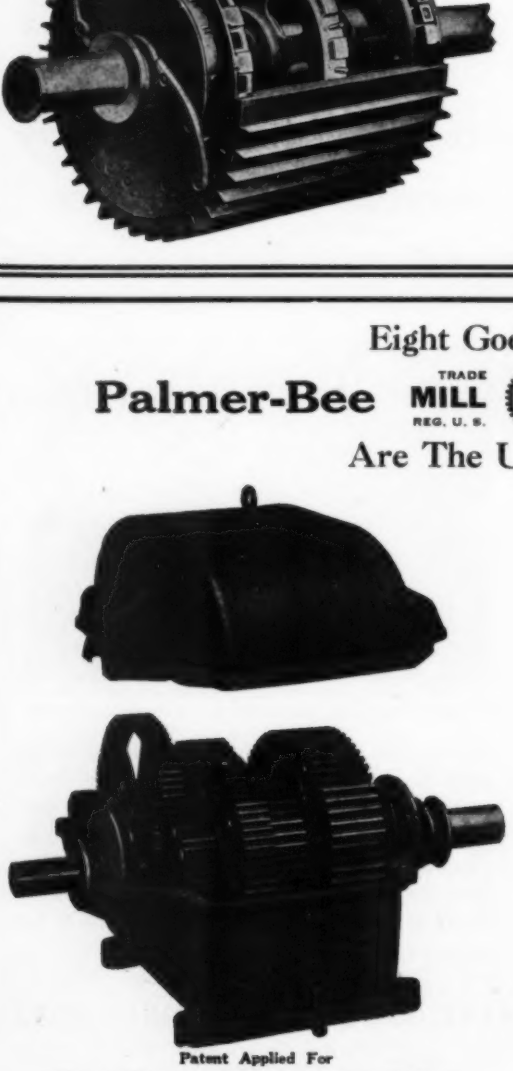
We manufacture Beating and Washing Engines, Head Gates, Hoists and Gears.

Our Wedge Type Bandless Roll made of semi-steel with special alloy bars is practically indestructible.

Eight Good Reasons Why

Palmer-Bee TRADE MILL REG. U. S. P-B MARK TYPE PAT. OFF. Speed Reducers

Are The Ultimate Standard



Patent Applied For

Cover Removed—Real Accessibility!

1. They are the most ACCESSIBLE reducers made. The entire mechanism is carried in the lower half of housing with an easily removable cover.
2. Every shaft is a THROUGH SHAFT supported in a bearing at each end. There are no overhung or divided shafts.
3. THEY HAVE NO gyrating planetary pinions or internal gears. No diaphragms, floating discs or overhung studs.
4. LUBRICATION is by splash system automatically flooding every bearing and entire mechanism. No grease or oil cups necessary.
5. The extreme QUIETNESS and COOLNESS of operation are two of the several reasons why this reducer is so highly efficient and durable.
6. The entire mechanism is FULLY ENCLOSED in a LEAK-PROOF, DUST-PROOF, ACCIDENT-PROOF and FOOL-PROOF housing.
7. The ratio may be INCREASED or DECREASED at any time by substituting one set of gears for another since all parts are made interchangeable.
8. They have TWENTY YEARS of engineering and power transmission experience built into them.

Super-Features

Simplicity, Accessibility, Efficiency and Durability

Palmer-Bee Company

Detroit, Michigan

Plant No. 1
2778-2804 E. Grand Blvd.

Plant No. 2
7341-7403 Orleans St.

the very keen competition that foreign pulps have been giving the domestic pulp manufacturer it is encouraging to hear news of this kind. It is explained partly by the fact that high priced rags have caused many writing paper mills to increase the percentage of pulps in certain papers and in order to do so without noticeably hurting the quality of the paper it has been necessary to select high grade domestic pulps.

International Closes Van Buren, Me., Mill

The pulp mill of the International Paper Co., at Van Buren, Me., has closed for an indefinite period. Lack of business is the ostensible reason. It is said that since the Rumford paper mill of the International Paper Co. was sold to Continental Paper & Bag Mills in February of this year, the Rumford property no longer purchased its pulp requirements from the Van Buren mill.

Reports from Maine state that two courses have been considered, one to sell the mill and the other to build a paper mill to handle its output. Low cost of Canadian pulp was the reason for the Continental Paper & Bag Mills turning away from old sources of supply.

The woodpulp map of the northeastern United States and Canada, a sequel to a most excellent paper mill map, has been prepared for distribution by the New England Paper & Pulp Traffic Association. The work was done by Messrs. Raphael and Loomis of the association's staff and shows in detail the production of pulp at each point and the excess available for market. The map is of office wall size and was compiled specially for the members of the association.

The Hurlburt Paper Manufacturing Co., of South Lea, Mass., a subsidiary of the American Writing Paper Co., has been closed by order of Sydney R. Wilson, receiver of the American Writing Paper Co., and the paper formerly made there will be turned out by Holyoke Mills. It is possible that this plant may be offered for sale in the near future. Walter J. Ingram, superintendent of the Hurlburt Paper Mfg. Co., has been retained in the main mills.

Civil Engineers Society of Boston heard M. H. Hallenbeck, consulting engineer, on March 12 at Chipman Hall explain peculiarities of paper mill construction. He pointed out certain hazards which must be recognized in design, including moisture and ventilation. He graphically recounted figures on New England's prominence in the paper industry, saying that 40 per cent of the 7,200,000 tons made yearly in the United States is produced in New England.

A report is current locally that Brown & Co. and Fraser Co., Ltd., of New Brunswick, are to be involved in the construction of a modern paper making plant in Fredericton, N. B. Such a development would be carried on by the Brown Corporation, the Canadian subsidiary of Brown & Co. Nothing official has as yet been mentioned in this connection and all reports to date are based on hearsay.

To meet a competitive rate granted to Fulton, N. Y., it is understood that Bird & Son, of East Walpole, Mass., have been granted a reduction by the New Haven railroad on roofing rags from Boston and Chelsea, Mass., to their Philipsdale, R. I., mill. New rates will be 10 cents and 12 cents, respectively, effectual April 20.

Tileston & Hollingsworth Co., well known Boston paper manufacturers, and the Penobscot Chemical Fibre Co., with mill at Great Works, Me., have moved their headquarter offices from the Massachusetts Trust Building to the new Congress Building, corner of High & Congress Streets, Boston, where they occupy the entire sixth floor.

Construction of the additions to the mill and filter plant of Crocker-McElwain Co., of Holyoke, Mass., are being completed. The structure is between the first and second canals. It is of brick and concrete mill construction, two stories, 30 by 100 feet. It will cost $40,000.

May 6 will see resumption of the important hearing before the Public Utilities Commission of Maine anent the protest of 15 Maine paper mills against increased pulpwood rates over Maine Central Railroad lines which have been effective since February 5.

Andrew P. Lane, traffic manager of the Great Northern

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Blow Pits
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Tanks, Vats, Etc.

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Kalamazoo, Michigan

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Steel Plate Construction
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RITER-CONLEY COMPANY
General Offices, Pittsburgh, Pa.

Guaranteed Perfect
Draper Hollow Balanced Brass Balls
FOR STUFF PUMPS
Absolutely balanced; will not pound out of shape

Specify these when ordering new pumps.

Order these to replace worn-out balls.

We make a specialty of repairing stuff pump balls.

We also manufacture—
SOLID BRASS BALLS
IRON AND STEEL BALLS
BALL CHECK VALVES
VALVE FACING TOOLS

The Draper Manufacturing Co.
Port Huron, Mich. Petrolea, Canada
Every ball bears our registered trade-mark

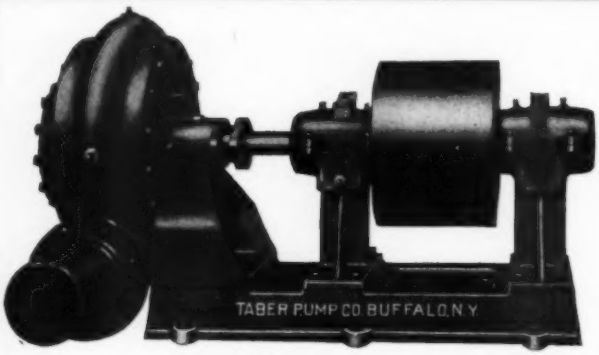


FIG. 601

TABER PUMPS

BUILT BY SPECIALISTS

FOR OVER 40 years we have been building various types of pumps to meet the particular needs of the service in which they are used. Taber Pumps reflect quality materials, skilled workmanship and infinite pumping knowledge put into their making, in the satisfactory service they give in operation.

Fig 601 represents Taber heavy duty open impeller type pump, for handling stock or white water.

Fig. 505 illustrates Taber "SV" Type Double Suction Centrifugal Pump, built in various sizes.

Submit your pumping problems to us for solution

TABER PUMP CO., Buffalo, N.Y.

Pump Specialists

Builders of Centrifugal and Rotary Pumps

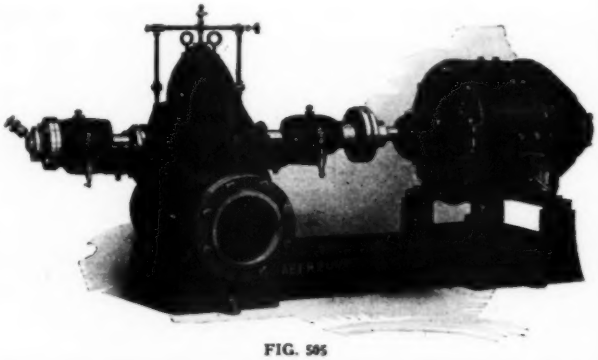
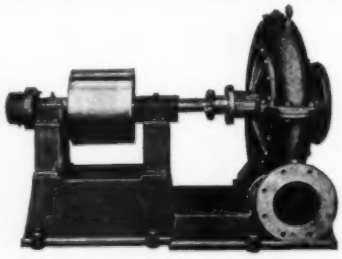
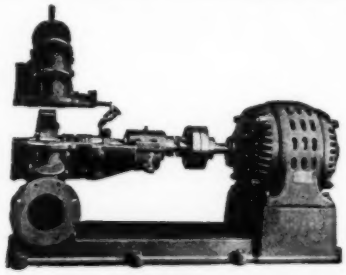


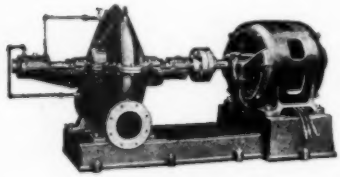
FIG. 505



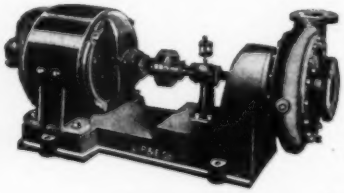
LAWRENCE "VORTEX" PUMPS



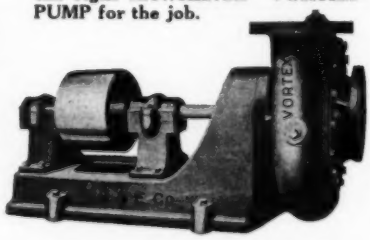
Extreme durability—Absence of repairs and dependability in operation of LAWRENCE "VORTEX" PUMPS simply reflect our many years of experience as Centrifugal Pump Specialists.



When a "VORTEX" Centrifugal Pump is put on a job it is sure to run true to its reputation for absolute reliability, and it is a part of our policy to recommend to you exactly the right LAWRENCE "VORTEX" PUMP for the job.



Horizontal split casing pumps of both single and double suction, with either open or enclosed impellers, and for moderate or slow speeds for pumping water, chemicals, or pulp.



Write for Our Pump Catalogue

LAWRENCE PUMP & ENGINE CO.

Lawrence, Mass., P. O. Box 70

New York Office, 90 West St.

Paper Co., has been elected a member of the governing board of the Maritime Association of the Boston Chamber of Commerce.

An Erroneous Report

In our March issue we ran a news item stating that it had been rumored that the Bath Iron Works, Ltd., of Bath, Me., were in bankruptcy.

A letter recently received from this company states that these rumors are absolutely groundless, that they are not bankrupt and that no receivers have been appointed.

The use of dynamite to control a fire in a huge pile of pulpwood logs at the Madison, Me., mill of the Great Northern Paper Co. was found to be the only effective method.

Boston & Maine Railroad announces readjustments on rates from Berlin, N. H., Ashland and Lincoln, N. H., to Newport News, Va., on paper.

Agnes H. Morey

Mrs. Agnes H. Morey, long prominent in both state and national woman suffrage activities, died at her home in Brookline, Mass., last month. She was a native of Boston and in her 54th year. At the time of her death she was vice-chairman of the National Woman's party. She is survived by her husband, Walter G. Morey, to whom she was married 35 years ago.

Mr. Morey is head of the Morey Paper Mill Supply Co., one of the largest and best known dealers in paper-making materials in New England.

William H. Carney

William H. Carney, former superintendent of the Cushnoc Paper Co., of Augusta, Me., at present in receivers' hands, was accidentally killed last month in the basement of the Racquette River Paper Co. mill at Unionville, N. Y. He was drawn about the shaft of a save-all machine and his clothing pulled about his neck, causing strangulation.

He was 60 years of age and born in Michigan.

George Pease

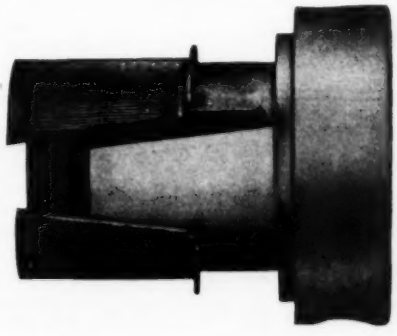
George Pease, 82 years of age, employed for years by Crocker Paper Co. and its successor Crocker-McElwain Co., died this month at his home in Holyoke.

He had contributed to the perfecting of many important paper-making devices.

Paper Chuck Perfected

A new roll collar designed for use with paper cores on which paper rolls are wound has been patented by the Oneida Chuck Company of Rhinelander, Wis.

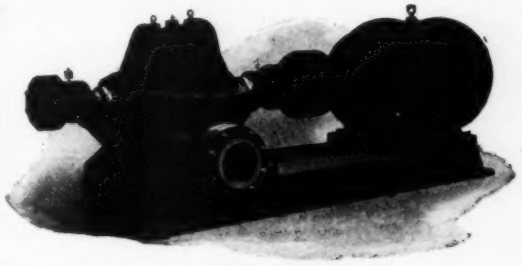
This chuck is said to have several advantages over those now in general use in that it grips the paper core evenly,



making slipping an impossibility. Paper cores have several advantages over those made of iron, in cheapness, transportation charges, time and labor saving, etc., and with the introduction of a device perfecting their use, there is good reason to believe that they will soon be in universal demand.

Don't brood over the past or dream of the future, but use the instant and get your lesson from the hour.

Aurora Centrifugal Pumps



Type OMD

Aurora pumps are made in many types, to meet all conditions found in the paper mill field.

We specialize in horizontally and vertically split open and inclosed impeller, single and multi-stage and deep well turbine centrifugal pumps as well as deep well reciprocating pumps.

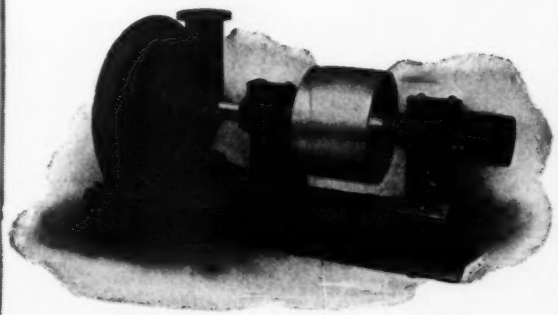
A card from you stating your conditions places our engineers at your service and results in a saving to you.

AURORA PUMP & MFG. CO.

Home Office and Factories, Aurora, Ill., U. S. A.

CENTRIFUGAL PUMPS

for

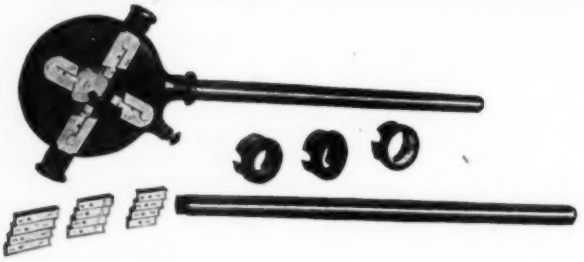


Water, Acid and Stock

Manufactured By

E. M. Cross Mach. Co.

BERLIN, N. H.



A New "TOLEDO"
For Cutting Over or Undersized Threads

This "Toledo" No. 1A has for 20 years been the most popular ratchet tool for threading 1" to 2" pipe. It is light, compact, and will reach the out-of-the-way job with ease; cutting the smooth, long tapered threads with a few easy strokes of the ratchet handle.

It is now equipped with special taper pins that permit a quick, positive and wide adjustment for cutting over or undersize, as well as standard threads, a most desirable feature especially when tight joints are as necessary as in the paper mill.

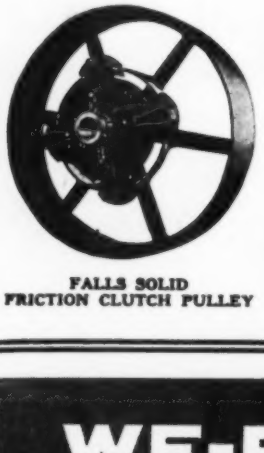
This "Toledo" No. 1A is but one model of the complete "Toledo" line of pipe threaders and cutters up to 12", all of which are the last word in pipe tool equipment.

Drop us a card for complete catalogue.

"TOLEDO"

THE TOLEDO PIPE THREADING MACHINE CO. TOLEDO, OHIO

New York Office 50 Church Street



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Pacific Coast News

April 1, 1924.

There has been much expression of approval recently in the news press of Oregon regarding the criticism of the federal trade commission of the Pacific Coast paper trust, which has been accused of unfair price fixing and boycotting by the federal commission. The Salem, Oregon, Journal states that the Oregon paper mills are selling their news product to small Oregon papers at $4.25 per 100 pounds in carload lots, F. O. B. mill, but sell to small California papers at 25c less per 100 pounds. The rates to the large Oregon and California newspapers is $3.75 F. O. B. mills, and then ship to Australia at $3.00 delivered.

The Oregon Pulp and Paper Company, located at Salem, Oregon, is one of the most modern paper mills in the world. The first car of paper was shipped just 15 months after building, on the 30th of September, 1920. At present the paper manufactured is by the sulphite process only, but plans are under way to include manufacture of wood pulp paper aiso. Much of the capital invested in local, and as Oregon has large forest resources the continued success of this new mill on the coast is assured.

B. T. McBain, general manager of the Nekoosa-Edwards Paper Company, Port Edwards, Wisconsin, was a recent speaker at the noon luncheon of the Live Wires in Oregon City, Oregon. Mr. McBain was formerly with the Crown Willamette Paper Company, Portland, Oregon, and while associated with them was an active member of the Live Wires.

The Daily News of Marshfield, Oregon, recently received a shipment of 21 tons of news print from Portland, Oregon, which was one of the items of cargo of the new freighter Mazatlan, running to southern ports. The News has contracted for three additional carloads of news print for the present year.

More than 100 tons of newsprint was recently shipped from Portland, Oregon, to Manila, for use of the American and Spanish daily and weekly papers. Most of this paper came from the Crown Willamette Paper Company, whose biggest mills are located at West Linn, Oregon, and Camas, Washington.

Mr. P. B. Sadtler, formerly eastern district sales manager of Swenson Evaporator Co., Philadelphia, Pa., has been elected a vice-president of the Swenson Evaporator Co. and will have general charge of sales at the main office, Harvey, Ill., succeeding Mr. F. M. de Beers, recently resigned. Mr. F. M. de Beers will continue to act as a director of Swenson Evaporator Co. Mr. H. B. Caldwell, who has been assisting Mr. Sadtler at Philadelphia, will remain in the East, with Mr. J. Ross Bates, 136 Liberty street, New York.

Charles Longenecker, formerly sales engineer with the Bonnot Company at Canton, Ohio, has become associated with the Combustion Engineering Corp. Mr. Longenecker was one of the first men to specialize in pulverized fuel and has been active in this field for many years past. He will be identified with the recently created industrial department of this company, which will specialize in the application of pulverized fuel to industrial work of all kinds.

"Instructions for the use of ton container" has recently been sent out to all liquid chlorine customers of the Mathieson Alkali Works (Inc.). This is in the form of a linen sheet 8½x11 inches and gives illustrated and written instructions for the handling of liquid chlorine containers.

The National Lime Association will meet on May 20-23, at the Greenbrier Hotel, White Sulphur Springs, W. Va. The program will include not only a report of the activities of the association, but there will also be scheduled certain special features, such as a golf tournament.

Karl A. Lefren, formerly chief engineer of the Robert Gair Company, has opened a consulting engineering office at 171 Madison Ave., New York City, where he will engage in the practice of engineering in connection with power, paper mills and general mill construction.

The firm name of Herrlinger & Company has been changed to The Union Selling Company. Only the name has been changed; the organization, management and policies are to remain the same.

IF YOU USE CHAINS USE UNION CHAINS

"The Chain of Double Life"

THEY GIVE LONGER SERVICE PER UNIT OF COST

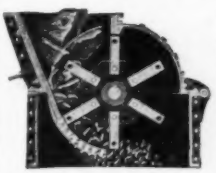
The bridged steel link insures strength and permanency. The large case-hardened pins and bushings, both reversible and renewable, insure durability and economy.

We can fill any of your requirements for elevators and conveyors, roller chains, bushing chains, attachment links, cast, cut, and renewable tooth sprockets.

Let Us Have Your Inquiries

THE UNION CHAIN & MFG. CO.
SANDUSKY, OHIO

America's Famous Coal Crusher



Gruendler Swing - Hammer Crushers are fast replacing all other types of crushers. Handles mine run of coal and reduces to fine uniform product for feeding stokers or for powdered fuel.

Tramp Iron or Foreign Material has no effect on a Gruendler.

We have replaced roll crushers in American Paper Products Co., Carthage, Ind., and many other mills.

We also manufacture paper pulp shredding and refining machinery, lime pulverizers, etc.

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Comparative Efficiency of Pulp Grinders*

W. A. MUNRO

Washington Pulp & Paper Corp., Port Angeles, Wash.

CONSIDERABLE discussion has taken place during some few years past concerning the relative merits of the new Voith Magazine type grinder and the older or pocket type. These discussions have created considerable interest in grinders and each type has its ardent supporters and satisfied users who are not backward in pushing forth the claims of their favored type. The Groundwood Committee for the past year has been endeavoring to secure as much data as it possibly could concerning the different types and their performance, and has been able to obtain a considerable body of valuable information on such points as hp. per ton, labor cost per ton, tons per stone per unit time, etc. This information we have tabulated and classified so that the salient features can be recognized at once. We have also secured samples of paper made from each type of grinder as we feel that the fact that one mill may use 60 hp. per ton with a certain type of grinder should not be used as an argument for or against that grinder on a basis of comparison with another type unless the running conditions in the mill, such as speed, per cent of sulphite, etc., and the quality of the finished product are taken into consideration with the horsepower figure.

Little Difference in Quality of Paper

We have found that there is but little difference in the quality of paper made of pulp from different types of grinders. We have found as great or a greater difference in the paper made by two different mills both using pocket grinders as we have in the paper made by two other mills, one using pocket grinders and the other using magazine grinders.

If freeness testing had gone ahead to such an extent that it would be possible to standardize groundwood, the matter of comparison would then be much simpler, but with the freeness tester of such value that it can be used only in one mill or a small group of mills where white water conditions are about the same, another basis of values must be taken.

The committee has been in touch with practically every large news print mill in the United States and Canada. We have selected twelve representative mills and tabulated the returns from them. We have not listed the initial price of any of the equipment as the prices vary so according to the year of installation that they would be practically valueless. I might say that a magazine grinder at present would cost very nearly $1,000 per ton of pulp produced while a pocket grinder would cost but $300 per ton.

The magazine type of grinder makes a much better looking mill than the pocket type. There is an almost total absence of steam, the walls and floor are free from pulp spatterings and all wood is handled on an upper floor.

TABLE

Type of grinder	Size of stone	Tons per stone	Power per ton-hp.	Labor cost per ton	Paper machine: Speed, f.p.m.	Paper machine: Efficiency, %	Paper machine: Sulphite, %	Strength, points
3-pocket...	27x54	6.5	65	$1.85	640	89	28	8
3-pocket...	27x54	6.0	61	1.54	480	92	16	9-10
3-pocket...	27x60	7.0	66	1.16	600	90	22	10
3-pocket...	27x54	7.5	52	.90	645	92	20	9
3-pocket...	36x54	10	62	.85	680	88	28	10
4-pocket...	27x60	10	56	.72	560	90	23	9
3-pocket...	54x54	15	54	.56	1000	94	22	10
Magazine..	54x67	20	68	.70	660	93	30	8.5
Magazine..	54x67	20	65	.77	560	90	23	10
Magazine..	54x67	18	67	.68	700	86	24	8
Magazine..	54x67	17	70	.72	1000	92	26	8.5

Conclusion

The magazine grinder using 4 ft. wood is much more economical in labor cost per ton over the three-pocket type of pocket grinder on 2 ft. wood producing less than 7½ tons to a stone per 24 hr. The saving in labor over this 2-foot type is so much that it more than over-balances the increased stone cost of the magazine type and higher power cost per ton. This higher power cost is due to the fact that more power is required on the magazine type to grind a ton of pulp than in the pocket type.

The difference in costs is not so great and rapidly disappears as the size and production of the pocket grinder increases. With a production over 7½ tons to a stone and up to 10 tons there is but little difference in the labor cost, the higher labor cost of the pocket grinder being largely offset by greater initial cost, higher stone and power costs of the magazine type. Over 10 tons to a stone the larger type of pocket grinder is more economical in every way than the magazine type.

*Presented at the Annual Convention of the Technical Association of the Paper Industry, April 9, 1924, at New York City.

The Vacuum Paper Machine Drier

(*Continued from page* 151)

more dryers than ordinarily would be the case. Many machine rooms of which the author knows are very oppressive places in which to work on a hot day in summer.

Conclusions

It has been shown above that the cost of a Vacuum Paper Machine Dryer is less than a standard paper machine dryer of equal capacity, and that the savings in steam, felts, and floor space are great, which together with improved working conditions and a better product, mark this method of drying paper as a revolutionary improvement in the art of paper making, second only to the advent of the Fourdrinier. It is a process which will rapidly come into general use.

In closing the author would like to add that the results obtained have come about after six years of intensive work on his own part and those associated with him. The development work was of a pioneer nature. Data had to be collected as the work proceeded. Much of this data could not be found in text books and was obtained only after a great deal of original research. Experiments were carefully and scientifically carried out and the results tabulated. All of this required considerable time and a lot of patience and perservance. The machine design called for careful study as the pressure due to the atmosphere is high and stress and strain diagrams had to be carefully made of all parts. These calculations have been proved and demonstrated as correct in the dryer which has been built and subjected to the most rigid tests.

Much credit is due to the loyal support the author has received from those associated with him in this work, who have given their time and energy in helping to solve problems as they arose. These associates are Mr. Geo. W. Dodge, formerly of the American Writing Paper Company and later Chief Engineer of the Brompton Pulp and Paper Company of Canada, Mr. J. S. Babbitt, formerly in the chemistry research department of the Barrett Company, Mr. F. M. Sanger, formerly test engineer of the Westinghouse Company and later superintendent of the Norwalk Iron Works. The author is the inventor of this process and machine for drying paper which has been thoroughly covered by applications for patents in the United States and all of the principal paper making countries in the world.

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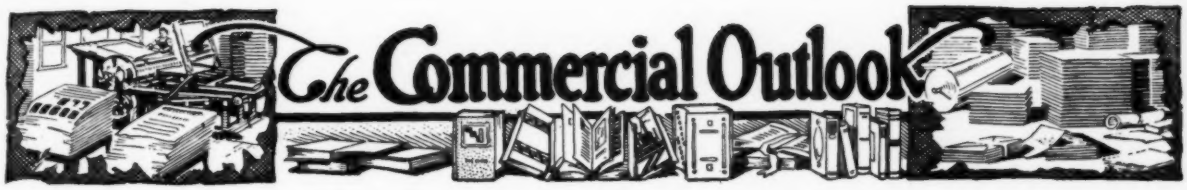

New York, April 1, 1924.

FROM all accounts, demand for paper is developing in a consistent manner and—viewing the market in its entirety—in fairly good volume. It is true that demand continues to be somewhat lopsided; that is to say certain kinds of paper are enjoying pronounced market activity, whereas others are wanted in decidedly less than normal tonnage.

There has been, if anything, a slight slowing down of demand during the last few days. This, however, is more or less a seasonal condition. It is the usual thing for both consumers and jobbers to let down in their buying just prior to the annual convention of paper manufacturers in New York because when paper mill executives come to the metropolis for their yearly gathering they mix a great deal with their large customers in this city and big paper users and dealers have found it to their advantage to await the arrival of mill friends in New York to effect purchases and arrange contracts in person.

Moreover, there has been a little quieting of business generally all over the country in the last few weeks. The reason for this is difficult to determine. Some believe the political situation in Washington apropos of the oil and other investigations has caused business men to proceed with more care and to effect a slowing down of commercial and industrial activity. Others express the opinion that production was permitted to reach slightly excessive levels in the first two months of the current year when business developed on a very encouraging scale, and that the present quietude is a natural reaction following the situation in January and February.

Whatever the cause, it is commonly admitted by men in all lines of business that they are not as busy as they were earlier in the year, and that an easing trend has developed in nearly all commodity prices. This obviously has affected paper business because the paper industry is so dependent on numerous other industries that when general commercial activity subsides the paper industry almost immediately feels it.

At the same time it can be said probably without fear of contradiction that consumption of all kinds of paper is running close to record-breaking levels. There are some branches of the trade which are far from active but there are also other kinds of paper which are being used in such heavy amounts today as to offset the smaller demand for those descriptions in limited call. News print is moving in heavy tonnage. With the pre-Easter shopping season here, department stores and other retail merchants are utilizing tremendous amounts of space in the newspapers for advertising their wares, and publishers in New York and all the big cities of the country are adding pages to their issues. Metropolitan afternoon dailies are printing issues of as many as 64 pages, and papers of 40, 42 and 44 pages are common in this city, some publishers putting out issues of this size every day in the week.

Newsprint production in the United States in February totaled 117,322 tons, compared with 128,772 tons in January last. Shipments from mills amounted to 115,427 tons, against 123,253 tons in January. Canadian mills produced 111,664 tons in February, contrasted with 109,875 tons in the preceding month, while mill shipments totaled 109,901 tons, against 107,966 tons in January.

A report issued by the Department of Commerce states that a new high record was set in 1923 in the consumption of news print paper in the United States. The figures for 1920 were exceeded by about 20 per cent, and those of 1922, by about 15 per cent. Total net consumption, the Department states, amounted to approximately 2,800,000 tons, of which mills in the United States produced 1,506,204 tons. This production was practically all consumed in the United States, the exports during the year being approximately 16,360 tons. Imports from Canada totaled 1,108,390 tons, representing about 80 per cent of the Canadian production. There were also 200,450 tons imported from Europe. The imports established a new high record, the purchases from each of the foreign countries exceeding any previous year by very substantial margins. Production in this country for 1923 was about 1.8 per cent less than that for 1920 and only about 2.55 per cent above that for 1922. Canadian production, however, continued to increase and the total production for the two countries for the year, amounting to 2,748,000, exceeded the previous high record set in 1922 by 218,000 tons, or approximately 9 per cent.

Book paper demand is fair and is showing a steady but slow increase. Advertising in fiction and trade periodicals is gradually mounting, and with publishers enlarging their issues, mills are called on to supply bigger amounts of paper. The Federal Reserve Bank estimated that the book paper mills of the country were running at about 80 per cent of capacity early in March, and there is every reason to believe this percentage has been increased to some extent since. Book paper prices exhibit more steadiness than in quite a while though no material changes have occurred.

Fine papers are moving in comparatively good amounts. Demand continues to run principally toward the cheaper lines but the volume of business is expanding, and after all that is what counts most. Wrapping and tissue have shown a little improvement recently or since retailers began to lay in stocks for the Easter season. One of the largest domestic manufacturers of kraft wrapping has advanced quotations a quarter of a cent per pound on No. 1 kraft, and other mills have followed suit.

Building papers continue active and seem likely to be more so as the spring progresses. Specialties of most kinds are in fair demand.

Box board demand is thus far disappointing to producers. The usual spring buying has not developed, at least not in the volume ordinarily encountered, and boards are rather soft in price. Plain chip is easily available in the East at $40 a ton, f.o.b. New York, and probably at lower prices, while news board is quoted at $45 per ton, New York.

Simplified Practice Recommendation

In accordance with the action of a general conference of representatives of manufacturers, distributors and users of paper, which met at the Bureau of Standards in Washington on June 19, 1923, the Department of Commerce recommends that the sizes of paper and their doubles, listed below, shall be recognized standards; and further, that all paper substance weights shall be stated in terms of the basic 25 x 40 inch size. This recommendation is to become effective July 1, 1924, and is to be subject to regular annual review by the industry with such yearly revision as may be shown to be desirable by experience and the investigation of the standing committee of the industry.

Stock Sizes

General Printing and Publishing

26 x 29 inches — 29 x 52 inches
25 x 38 inches — 38 x 50 inches
32 x 44 inches — 44 x 64 inches
35 x 45½ inches
37 x 49 inches

Forms and Letterheads

(Bonds, ledgers and writing papers)

17 x 22 inches — 22 x 34 inches
17 x 28 inches — 28 x 34 inches
19 x 28 inches — 24 x 38 inches

Book Publishers

30½ x 41 inches — 41 x 61 inches

National Safety Congress Plans for Annual Meeting

The National Safety Council will hold its thirteenth annual Safety Congress in Louisville, Ky., September 29 to October 3, it was announced by W. H. Cameron, managing director, following a meeting of the executive committee in Chicago recently.

The industrial sections of the Council already have begun to plan programs for the sectional meetings at the congress, and the business and industrial leaders of Louisville are organizing committees to arrange the many details and to cooperate with the officers of the National Safety Council in preparation. Officials are planning for an attendance of more than 4,000.

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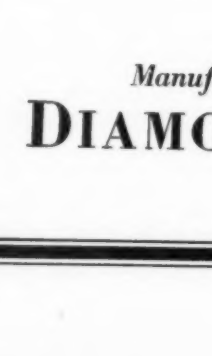

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Papermaking Rags

It is somewhat proverbial that following every appreciable advance in prices of papermaking rags, there is a decline in the market. This old rule is being borne out at present. Rag values are on the downtrend after having experienced the greatest rise since the boom days of 1920—a rise which carried market levels up beyond any point reached since the never-to-be-forgotten period of business following the world conflict.

The rag market was constantly on the uptrend during January and February. One reason, if not the principal reason, for this was the heavy buying of low grades of rags by roofing paper manufacturers, who encountered a tremendous increase in demand for their product and who consequently were obliged to increase in like proportion their purchases of raw material. Early in March, however, the rag situation began to weaken. Since then prices have steadily eased, and market levels are now at a point representing a rather sharp decline from the top marks touched toward the end of February.

The easing of rag prices has been orderly. Gradually market levels have worked downward, and, judging from prevailing indications, the decline has not yet spent its force, which means, in other words, that lower prices are likely to be seen before the off movement is checked. It might be said that the reason for the easiness lies in the same quarter as that which was the main cause of the advance. Demand from roofing paper mills has subsided to a pronounced degree, and those grades chiefly consumed by this class of mills soon weakened when the consuming outlet narrowed, with the result some of the better grades of rags also adopted an easier trend.

Imports of papermaking rags in the last several weeks have come very nearly constituting a record so far as tonnage goes. This probably accounts in part for the slowing down of demand from mills as a good many consumers likely have covered their requirements for a time. It appears also that activity in the roofing paper market has decreased, which has led to curtailment of buying of rag stock.

It is anybody's guess what is likely to happen in the rag market during the next several months. The spring is usually a period when papermakers curtail buying because collections increase and a larger supply of rags is available. The situation may not run "true to form" this year, however. It should be remembered that the past winter was a very open one over most of the country and that rag collections continued without much of a let-up. Also the very high prices prevailing have been incentive enough for dealers to go to every extreme to gather rags. Moreover Europe has been drained of rags so that stocks there must be materially diminished. There is therefore every probability that usual spring collections will not be forthcoming this year in the tonnage ordinarily noted. Dealers may scour the country and still be unsuccessful in locating normal supplies of rags,

The future situation seems to hinge entirely on the volume of demand. If paper mills consume rags in tonnage approximating or even approaching that since the first of the current year it is more than likely rag prices will remain high; indeed it is probable another sharp advance will be recorded later on, since there is every possibility somewhat of a shortage may arise. On the other hand, if consumption is no greater than normal and demand runs along on a fairly even keel such as it has been in the last several weeks, not only is it improbable that prices will again rise but it is likely still lower market levels will be witnessed.

The better qualities of papermaking rags are holding moderately well on close to the top levels reached in the recent advance. There has been some slight recession in certain grades, particularly those which are consumed by other than paper mills, reflecting the market slowing down of demand from consumers other than papermakers apropos of the sharp drop in raw cotton prices. New cuttings are high, in comparison with normal, yet prices on some descriptions are a little below the levels of a short time ago. Old white rags are fairly steady in price, and so are thirds and blues. The decline thus far has mainly involved the low qualities or those used principally by roofing paper manufacturers.

No. 1 roofing stock is selling at around 2.35 cents per pound f. o. b. dealers' shipping points, and No. 2 stock at 2.25 cents. The high points touched by these grades in February were fully a half cent per pound above these figures, and in exceptional cases more than that. Foreign roofing rags have declined to where importers quote foreign dark colored cottons at 2.25 cents a pound ex dock New York, for spot lots, and, according to reports, down to 2 cents c. i. f. New York, for forward shipment from abroad. The market condition is such that it is probable buyers have secured some roofing rags—both domestic and foreign—slightly under these prices.

Repacked thirds and blues are quoted at 4 to 4.50 cents a pound at dealers' shipping points, depending on the quality of packing, and rough blues at 3.25 to 3.75 cents. Old No. 1 repacked whites are bringing anywhere from 7.50 to 8.50 cents a pound at shipping points, according to the packing, and No. 2 repacked whites 4.50 to 5 cents. New No. 1 white shirt cuttings are quoted 14 to 14.50 cents a pound at dealers' points.

Average quotations f. o. b. shipping points and ex dock New York follow:

New Stock—	New York and Chicago
White shirt cuttings, No. 1	14.00-15.00
White shirt cuttings, No. 2	7.00- 7.50
Fancy shirt cuttings	7.00- 7.25
Washables, No. 1	5.50- 5.75
Unbleached muslins	12.00-12.50
White lawns	11.50-12.00
Overall cuttings, blue	9.00- 9.50
Black silesias	5.50- 5.75
Light flannelettes	10.00-10.50
Canton flannels, bleached	11.75-12.00
Canton flannels, unbleached	11.25-11.50
Shoe cuttings, bleached	10.00-10.25
Shoe cuttings, unbleached	9.00- 9.25
Light silesias	8.75- 9.00
O. D. khaki cuttings	5.75- 6.00
Mixed khaki cuttings	5.25- 5.50
Corduroy cuttings	3.75- 4.00
Cottonade cuttings	4.50- 4.75
Linens, No. 1 white, foreign	16.00-17.00
Light prints, foreign	6.50- 7.00
Old Stock—	
Whites, No. 1, repacked	7.50- 8.50
Whites, No. 2, repacked	4.50- 5.00
Whites, house soiled	4.00- 4.25
Whites, street soiled	3.75- 4.00
Lace curtains	4.75- 5.00
Thirds and blues, rough	3.25- 3.75
Thirds, and blues, repacked	4.00- 4.50
Black stockings	4.00- 4.25
Cotton canvas, No. 1	4.50- 4.75
White cotton batting	5.25- 5.50
Roofing, No. 1	2.30- 2.50
Roofing, No. 2	2.20- 2.40
Dark colored cottons, foreign	2.20- 2.30
Blue linens, foreign	5.00- 5.50
Gray linens, foreign	6.00- 6.50
White linens, foreign	11.00-11.50
Light prints, foreign	4.00- 4.25

Rope and Bagging

Ruling prices on old manila rope are rather irregular. Indications are that the market has strengthened in the last few days; at any rate, there have been reports of some paper manufacturers coming into evidence as buyers and paying stiff prices for rope, whereas the leading paper mill buying agency is said to be still securing old rope at approximately the figures previously noted. It is apparent that there is not a great deal of old manila rope obtainable. Production has been diminished for some months owing to depression in the shipping industry, and dealers in general assert they are carrying practically no stock and that supplies are coming in from collection sources in smaller accounts than they ever

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have witnessed. Prices named by European dealers are high and offerings limited, indicating that stocks there also are small.

It is stated that domestic manila rope in No. 1 dry condition has been sold to paper mills in excess of 7 cents a pound, 7.25 cents being the price mentioned. On the other hand, it is asserted purchases have been effected down to 6.75 cents. Foreign manila rope ranges in price from 6.50 to 7 cents ex dock New York. Mixed strings are quoted at 1.25 cents per pound, and sisal strings at 2.25 cents and higher.

There was a marked spurt in demand for old bagging from roofing paper mills recently, but this has subsided. Roofing bagging is now quoted around 1.25 cents a pound at dealers' shipping points, No. 1 scrap bagging at 1.50 cents, and No. 1 domestic gunny at 1.50 to 1.65 cents.

F.o.b. shipping point quotations follow:

	New York and Chicago
Gunny, No. 1 domestic	1.50-1.65
Gunny, No. 1 foreign	1.45-1.60
Scrap bagging, No. 1	1.40-1.60
Roofing bagging	1.15-1.25
Wool tares, heavy	1.60-1.75
Wool tares, light	1.50-1.60
Manila rope, No. 1, foreign	6.50-7.00
Manila rope, No. 1, domestic	6.75-7.25
Sisal strings	2.25-2.50
Mixed strings	1.25-1.50

Old Paper

The market for old paper has weakened to a pronounced degree. Demand has sagged to a point where some grades are wanted in far less than normal volume, and even those descriptions in biggest call are moving in not more than usual tonnage. Prices have steadily eased until dealers and packers complain of their inability to realize a profit in collecting, sorting and baling stock under prevailing market levels. This is especially true of the low qualities, reflecting the very limited buying of box board mills.

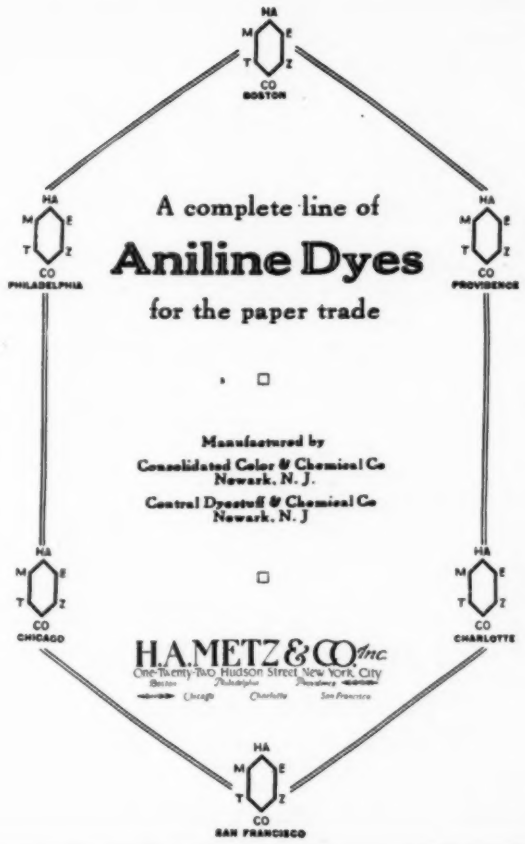
Prices mean little at present because buyers in most instances can and are securing the supplies desired at less than the figures which are generally accepted as representing market levels. Folded newspapers are selling in the East at 75 cents a hundred pounds f.o.b. dealers' shipping points, and No. 1 mixed paper at 60 cents. In the West higher prices obtain, dealers quoting about $1 a hundred pounds on folded news and 85 cents on No. 1 mixed paper. Old magazines have declined to where sales have been recorded in the East at 1.35 cents f.o.b. New York for No. 1 heavy book, while ledger stock is off to 1.65 cents. Shavings are little wanted by consumers. Some movement of No. 1 soft white shavings at 3 cents a pound f.o.b. New York has been noted, but prices in certain quarters are under this at present. Hard white shavings of No. 1 quality are quoted 3.75 to 4 cents per pound at shipping points.

F.o.b. shipping point quotations are:

	New York and Chicago
Hard white shavings, No. 1	3.75-4.00
Hard white shavings, No. 2	3.25-3.50
Soft white shavings	2.85-3.10
Colored shavings	1.50-1.75
Heavy book, No. 1	1.35-1.50
Crumpled book, No. 1	1.15-1.25
Ledger stock	1.65-1.85
Kraft, No. 1	2.00-2.15
Manilas, No. 1	.90-1.15
White blank news	1.75-1.85
Over-issue news, No. 1	.90-1.15
Folded news	.75-1.00
Mill wrappings	.80- .90
Mixed paper, No. 1	.60- .85
Common paper	.50- .60

Chemical Pulp

There is no question that the undertone in the wood pulp market is steadier; moreover, it appears as if business has increased to some extent and the prospects for greater activity in the trade are brighter than they have been in quite a while, yet on the other hand demand has not broadened sufficiently to have any actual strengthening influence on values, prices are still soft in some quarters and the market situation as a whole is far from satisfying to the pulp producer or dealer. In the case of bleached sulphite, there is clearly a firmer tone, which seems due more to the strike in the pulp mills of Norway than to any appreciable increase in demand for this kind of pulp. It is recognized that the United States secures a good part of its supply of bleached sulphite from the Scandinavian country, and should the curtailment of production there con-



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tinue because of the strike for any length of time, demand for domestic bleached sulphite would probably expand. Therefore there is a sentimental steadying of quotations on this description of pulp, with domestic manufacturers quoting 3.75 to 4.50 cents a pound f.o.b. pulp mills, depending on the grade. Easy bleaching sulphite is quoted at 2.75 to 3 cents at producing plants, news grade sulphite at 2.50 to 2.75 cents, and bleached soda pulp at 3.50 to 3.75 cents. Kraft pulp is selling from 2.60 to 3 cents, according to quality, f.o.b. producing points.

Reports state that quite a few pulp manufacturers in the U. S. and Canada are appreciably curtailing production, reflecting the lack of profit in pulp manufacture under prevailing market conditions and the limited demand from consuming quarters. This may eventually serve to improve the market, but it will require time, especially since there is every sign that available supplies are ample to cover consumers' wants for some while to come.

F.o.b. pulp mill quotations follow:

Bleached sulphite	3.75-4.50
Easy bleaching sulphite	2.75-3.00
Unbleached sulphite, No. 1	2.60-2.90
News grade sulphite	2.50-2.75
Soda pulp, bleached	3.50-3.75
Mitscherlich, unbleached	3.00-3.25
Kraft, No. 1	2.60-3.00
Screenings, refined	1.50-1.75

Mechanical Pulp

There has been a sagging trend in mechanical pulp values. Prices have eased in a gradual manner until market levels are now lower than have been noted in quite a lengthy interval. Demand for ground wood is not so bad. In fact, there are numerous indications that it is normal or better than normal. News print mills are consuming it on a large scale and other users are absorbing supplies in fairly heavy tonnage. The main factor in the market, however, is that production is keeping pace with, if not slightly exceeding, the consumption. This means that there is a surplus, in some quarters at least, and there are consequently sellers who are anxious to dispose of stocks and who do not hesitate to cut prices to effect sales. Furthermore, some fair-sized shipments of ground wood have arrived recently from Europe—chiefly from Norwegian sources—and these have added to the available supply here.

Domestic producers assert they should receive $36 a ton or thereabouts f.o.b. grinding plants for spruce ground wood based on present manufacturing costs, but most sales of domestic pulp reported are at substantially below this level, transactions at $30 and even $29 being reported. Imported ground wood is quoted at around $33 a ton ex-dock New York, though buyers are probably bettering this price in some instances.

Chemicals

Papermaking chemicals are moving into consuming channels in a fairly steady manner, though in no unusual quantities. Buyers seem interested only in immediately needed supplies and are limiting their orders accordingly. Casein is quoted at 12 cents a pound, with cheaper prices mentioned in exceptional cases, evidently reflecting the rather large imports recently. Bleaching powder is quotably higher at about 2 cents per pound. Soda ash is quoted at 1.38 cents a pound on a flat basis, and caustic soda at around 3.15 cents.

Average quotations are as follows:

Alum, lump ammonia	3.25- 3.50
Alum, lump starch	3.75- 4.00
Blanc fixe, powdered	4.00- 4.25
Bleaching powder	1.90- 2.15
Brimstone (long ton, at mine)	18.00-20.00
Casein (duty paid)	11.00-13.00
Caustic soda, spot delivery	3.00- 3.25
China clay, domestic washed	12.00-15.00
China clay, foreign	15.00-20.00
Rosin, grade E	5.75- 5.85
Satin white	2.00- 2.25
Soda ash, 58 per cent light (bags)	1.38-
Starch, papermakers', in bags	3.40- 3.70
Talc (ton)	14.00-16.00

The Celotex Company, whose general offices are in the Conway Building, Chicago, are arranging an expansion program estimated to cost more than $20,000,000. These plans will include extensions in Hawaii, Cuba and other points. The company is now completing an addition to its plant in Marrero, La., which will cost $1,000,000. They manufacture composition board products from bagasse.

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Quality and Service Guaranteed by the Largest Source of Supply
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Caustic Soda
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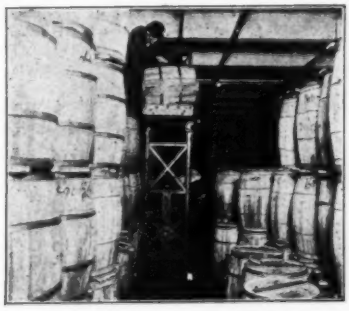

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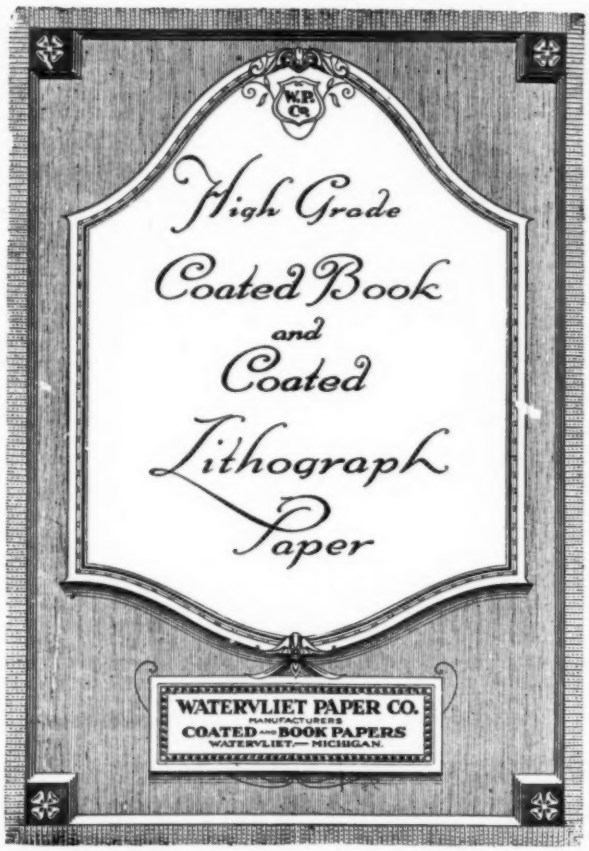
Paper Testing Methods (1922)

A LARGE edition of this handbook for paper mill laboratories was exhausted shortly after the type had been distributed. In view of the insistent demand the Technical Association has arranged for a republication and PAPER TESTING METHODS is again available at $3 per copy. The work covers detailed procedure for microscopical analysis, physical testing and chemical analysis of the paper with descriptions of the apparatus employed.

It is the only complete and up-to-date handbook on paper testing published in the English language.

It should be in the hands of every paper manufacturer and paper dealer as well as concerns who are large users of paper.

Technical Association of the Pulp and Paper Industry
18 East Forty-first Street
NEW YORK, N. Y.



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EXECUTIVE COMMITTEE

In addition to Officers, the following are also members of the Executive Committee:

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SETH L. BUSH, Manager, Research Department, Crocker McElwain and Chemical Paper Mfg. Companies, Holyoke, Mass.

DR. HUGH P. BAKER, Executive Secretary, American Paper & Pulp Association (Ex-Officio).

EMMETT H. NAYLOR, Secretary-Treasurer, Writing, Cover and Tissue Associations (Ex-Officio).

New Papers

Writing—	
White rag	20-45
White sulphite	11-30
Colored rag	16-40
Ledger—	
White rag	20-50
White sulphite	13-30
Colored sulphite	40-30
Colored rag	16-50
Bonds—	
White rag	19-45
White sulphite	9-30
Colored sulphite	10-30
Colored rag	18-45
Book—	
No. 1 S. & S. C	6.25- 7.00
Machine finished	6.00- 6.75
English finished	6.25- 7.00
Coated and enameled	8.00-12.00
Lithographed, M. F	9.00-14.00
Newsprint—	
Rolls, contract	3.75- 4.00
Rolls, transient	4.00- 4.25
Sheets	4.25- 4.50
Side runs	3.25- 3.75
Cover Stock—	
Coated, both sides	10.25
Coated, one side	10.15
Tissue—	
No. 1 white, 20x30	.75- .85
No. 2 white, 24-36	.70- .75
No. 1 manila, 24-36	.70- .75
Kraft	1.00- 1.25
Wrapping—	
No. 1 Kraft	6.00- 6.75
No. 2 Kraft	5.25- 5.50
Boards—	New York and Chicago
Solid news	45.00-50.00
Straw	55.00-60.00
Plain chip	37.50-42.50
White coated chip	60.00-65.00
Manila coated chip	55.00-60.00
Binder's board	70.00-75.00

Nation's Paper Mill Superintendents to Meet at Dayton

A program discussing subjects ranging from apprenticeship in the paper mill, vocational education, to the most highly technical problems confronting the paper mill superintendents has been practically completed for the annual convention of the American Pulp and Paper Mill Superintendents' Association in Dayton, Ohio, in May, under the direction of H. W. Server, of The Miami Paper Company, West Carrollton, Ohio, general chairman.

The convention is to open at 9 A. M. Thursday, May, 22, at The Miami Hotel. Papers on various problems that confront the superintendents will be presented by authorities at morning and afternoon sessions. The banquet will be held at 7 P. M.

The general business session will be held on Friday morning in Dayton, followed by luncheon at the Manchester Hotel in Middletown, Ohio. The divisional meetings will be held in the afternoon at various places in Middletown. Friday evening at the banquet, which will be held at the Dayton Country Club, "Dusty" Miller, a country editor who is fast becoming famous as an after-dinner speaker, will talk. Charles F. Kettering, president of The General Motors Research Corporation, may have a place on the banquet program, as also will Martin Collins, of the Graham Paper Company, St. Louis.

Saturday will be given over to visits to the various mills and plants of the allied industries of the Miami Valley, many of whom are making special entertainment features for all the visitors.

The following is a partial list of the papers that have been prepared for the convention and will be given during the sessions on Thursday and Friday:

"Apprenticeship in the Paper Industries," George P. Hambrecht.

"Building and Maintenance of an Organization," Robt. B. Wolf, R. B. Wolf Co., New York.

"Employment Problems," Frances S. Pope, Mead Pulp & Paper Co.

"The Beater of Today," Charles Shartle, The Shartle Bros. Machine Co.

"Drying of Paper," E. P. Gleason, C. E., Nekoosa-Edwards Paper Co.

"The Development of Recording Devices as Applied to the Art of Paper Making," M. A. Goetz, General Electric Company.

"The Use and Abuse of Paper Making Felts in Paper Mills," M. C. Burrell, Orr Felt & Blanket Co.

"Steam and Power in Pulp and Paper Mills," H. S. Taylor, President T. A. P. P. I.

"Manufacture and Use of Bleached Ground Pulp," Lyman Beeman, Cons. Waterpower and Paper Co.

"Vocational Education," Harry P. Carruth, Gen. Manager, Mead Pulp & Paper Co.

"Paper Making Fiber," B. S. Summers, Port Huron.

"Beating of Kraft," A. W. Bronk, Deerfield Valley Paper Co.

"Tinting of White Paper," John R. Roberts.

Many Enroll in Pulp Making Extension Course

Madison, Wis.—Eighty-nine pulp mill operatives, managers, foremen, and technical men from all over the United States have enrolled in the extension course in pulp making conducted by the U. S. Forest Products Laboratory in co-operation with the University of Wisconsin Extension Division. Dr. C. E. Curran of the pulp and paper section of the Forest Products Laboratory has charge of the course.

The students have a wide geographical distribution. Although 52 of them are from Wisconsin there are representatives from New York, Maine, Illinois, Mississippi, Minnesota, North Carolina, Michigan, Ohio, Washington, Indiana, Pennsylvania, Maryland, Oregon, Tennessee, and Mexico. Among the students enrolled are mill managers, superintendents, chemists, plant engineers and assistants, foremen, cooks, liquor makers, machine tenders, clerks and salesmen, and others representing practically every department in the pulp and paper mill.

The course is the outgrowth of an effort made some time ago by the Technical Association of the Pulp and Paper Industry and the Technical Section of the Canadian Pulp and Paper Association to improve American paper mill practice by the education of mill operatives. To this end a fund was raised for the writing of a standard textbook on American mill practice. Hitherto the majority of all textbooks available were based on European practice and problems. This new work is used as a text in the correspondence course.

Takes Over the McNamee Clay Sales

A new corporation, the North American Clay Company, has been formed, which has taken over the McNamee Kaolin Corporation at Bath, S. C., and the Continental Clay Company at Langley, S. C.

Extensive improvements are already under way and a new plant is being built. It is planned not only to increase the production but to carry in stock large reserves of finished clay to insure prompt service and shipments to the paper trade. This new operation will be of considerable interest to the paper mills, as the McNamee mine has been in operation since 1868 and the product has been used for paper filling for many years.

These investments are being made not only to insure prompt and dependable service but also a supply of carefully graded clay suitable for filling the best grades of white paper. The new company will control one of the largest known deposits of white clay, the tonnage having been estimated as high as 15,000,000 tons. The clay sales will be handled exclusively by the R. T. Vanderbilt Company, New York.

The B Quality Pulps

HAFSLUND NORWAY

"HAFSLUND BEAR"
Bleached Sulphite

F: HAGA

"FORSHAGA"
Bleached Sulphite

KRAFT HURUM NORWAY SPECIAL

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Extra Strong Kraft

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LONG DISTANCE CONVEYOR OF WATER AND PAPER STOCK IN PAPER AND PULP MILLS—Specially Adapted to Carry Sulphite, Ground Wood and "White Water"

Eighteen reasons why you should use "Michigan" combination steel and wood pipe

1—Durability of Wood Shell. 2—Sanitary. 3—20% more capacity than Cast Iron Pipe. 4—Simplicity in handling. 5—Light in weight. 6—Speed in laying. 7—Protects against freezing. 8—Not affected by Electrolysis. 9—Rigid inspection of materials. 10—Efficient construction of stave. 11—Strength of steel banding. 12—Protection of banding with asphalt coating. 13—Cannot burst under pressure. 14—Can be laid in a wet trench. 15—Short curves without specials. 16—Low installation and maintenance cost. 17—Responsibility of company. 18—Not affected by sulphur or chemical solutions.

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EXPORTS

Paper exports from the United States during the month of January, 1924, which figures are the last issued by the Government so far, were valued at $2,051,584, according to the Paper Division of the Department of Commerce, showing a loss of $134,623 compared with the preceding month, but a gain of $90,043 compared with January, 1923. While the loss as compared with December was fairly well distributed, the majority of the various classes showing a decrease in value were: Book paper, $54,743; wrapping paper, other than kraft, $51,412; tissue and crepe paper, $12,100; toilet paper, $13,096; carbon paper, 11,947; paper board and strawboard, $17,603, and wall board, $20,636.

Playing cards, exports of which increased enormously in 1923, also fell off to the extent of $15,073 in January contrasted with December. These losses were compensated to a great extent by an increase of $50,116 in exports of photographic paper and $21,858 in exports of surface-coated paper. Other classes which showed an upward tendency during January included news print, greaseproof and waterproof paper, hanging paper, towels and napkins, paper bags and boxes and cartons.

If the comparison is made with January, 1923, a much better result is shown, exports of the various kinds of paper, with a few important exceptions, showing substantial increases, varying from approximately $10,708 in the case of carbon paper to $65,314 for news print and $86,737 for paper and strawboard. On the other hand, important losses took place in export of book paper, toilet paper, and playing cards.

IMPORTS

Wood Pulp

From all accounts, there has been some fairly heavy buying of wood pulp abroad by American paper manufacturers. Reports say that purchases in the last few weeks, or since the first of the current year, have approximated record proportions, though of course most of the pulp contracted for has been for forward shipment from Scandinavia in the spring and early summer following the opening of navigation over the Baltic. This buying, from all appearances, has had little effect on the market situation other than to stiffen quotations at primary sources in Europe to some extent. Swedish manufacturers are said to be well sold up for the balance of the year, with American buyers having taken the bulk of their pulp, and the result is the Swedes are exhibiting greater firmness regarding prices when dickering on additional sales.

The market in Norway also is firmer. This is due in large part to the strike of pulp and paper mill workers in that country, which has drastically reduced the output of pulp for the time being. Should the strike in Norway continue for an appreciable length of time the influence on the pulp market in the United States would doubtless be pronounced since American papermakers secure a good part of their bleached sulphite supply from the Norwegian source, and any curtailment of supply from this direction would be materially felt here.

Importations of pulp into the United States continue on a fairly heavy scale, judging from latest available statistics, though there has been the customary reduction during the winter months due to the closing of the Baltic. Imports in January were somewhat below those in January, 1923, but were nevertheless up to normal. Total imports of chemical pulp of all kinds in January were 79,097 net tons, valued at $5,105,326, compared with 103,997 tons for a value of $6,492,772 in January last year. Importations in January last were divided 42,360 tons of unbleached sulphite, 17,604 tons of bleached sulphite, and 19,124 tons of kraft. Imports of mechanical pulp in January totaled 15,768 net tons, contrasted with 28,988 tons imported in the same month last year.

The market tone at New York and other American Atlantic ports is far from firm. There is some degree of steadiness to be noted, evidently the result of the firmer position of pulp at primary sources abroad, but reports of sales at price concessions on this side are repeatedly being heard. This would intimate that there are still some importers who find it necessary to cut prices to effect sales, or else that they are in a position where it is imperative they liquidate stocks and therefore do not permit a question of price to stand in the way of turning pulp into cash.

Quoted prices have undergone but slight revision during the last month. Bleached sulphite of No. 1 quality is quoted from 3.75 cents a pound ex-dock New York up to 4.25 cents and even higher, depending on the grade of pulp involved. No. 2 bleached sulphite is said to be available down to 3.25 cents per pound ex-dock. Strong unbleached sulphite is quoted at around 2.65 cents a pound on the dock at New York, and easy bleaching sulphite between 2.75 and 3 cents. Scandinavian kraft is selling at 2.50 to 2.65 cents a pound ex-dock, while imported ground wood is quoted generally around $34 a ton, though most sales are at a dollar or two under this price.

Receipts at the port of New York in March and current market quotations ex-dock New York follow:

Bleached sulphite, No. 1	$ 3.75- 4.25
Unbleached sulphite, No. 1	2.60- 2.90
Easy bleaching	2.75- 3.00
Mitscherlich unbleached	2.80- 3.00
Kraft	2.50- 2.75
Ground wood, per ton	32.00-35.00

Nilsen, Lyon & Co., 1,400 bls. from Christiania; M. Gottesman & Co., 1,950 bls. from Rotterdam and 685 bls. from Trieste; Ira L. Beebe & Co., 800 tons from Port Midway, N. S.; J. Andersen & Co., 2,650 bls. from Christiana, 9,600 bls. from Greaker and 1,568 bls. from Trieste; Kelly & Co., 750 bls. from Gothenburg; Johaneson, Wales & Sparre, 1,200 bls. from Gothenburg and 12,084 bls. from Harnosand; E. M. Sergeant & Co., 910 bls. from Gothenburg and 200 bls. from Christiania; Castle & Overton, 520 bls. from Rotterdam; Hartig Pulp Co., 1,045 bls. from Rotterdam; R. F. Hammond, 1,000 bls. from Christiania; E. J. Keller Co., 301 bls. from Hamburg and 500 bls. from Trieste; E. Naumberg & Co., 3,402 bls. from Trieste; Guaranty Trust Co., 21,000 bls. from Christiania; Tidewater Paper Mills Co., 24,670 bls. ground wood from Liverpool, N. S.; Chase National Bank, 6,156 bls. from Hango; Lagerloef Trading Co., 764 bls. from Helsingfors and 913 bls. from Hango; Globe Shipping Co., 10 bls. from Rotterdam; Order, 1,250 bls. from Christiania, 949 bls. from Hango and 3,079 bls. from Helsingfors.

Paper Stock

The outstanding feature in imports of papermaking material other than wood pulp into the United States in March was the big increase in arrivals of rag stock. Receipts of rags were unusually heavy. Taking the arrivals at the port of New York as a criterion, it seems quite likely that somewhat of a record for rag importations was established last month, as the amount of rags received through the port of New York was little short of astounding. Most of the month's arrivals probably were sold prior to shipment, and evidently were a reflection of the heavy buying of mills, particularly the roofing paper plants, in January and February.

Imports of other materials were fair, there being sizeable lots of old rope, bagging and waste paper received. Imports of all kinds of papermaking material at the port of New York in March, with names of consignees, follow:

Old Rope

Brown Bros. & Co., 62 bls. from Hamburg, 234 coils and 68 bls. from Rotterdam, 34 coils from Bremen, 487 coils from Hull, 77 coils from Newcastle, 120 bls. and 138 coils from Antwerp and 75 bls. and 39 coils from Marseilles; H. A. Kessel, 2 coils from Bergen; W. H. Cummings & Son, 369 coils and 66 bls. from Havre; E. J. Keller Co., 42 bls. from Rotterdam, 242 coils from Newcastle and 248 coils from Copenhagen; R. F. Downing & Co., 68 coils from Rotterdam; Equitable Trust Co., 29 bls. from Rotterdam; International Acceptance Bank, 166 bls. from Genoa; International Purchasing Co.,

J. ANDERSEN & CO.
21 East 40th Street, New York City

Importers of Chemical Pulps
BLEACHED AND UNBLEACHED

Agents for Kellner Partington Paper Pulp Co., Ltd.
Sarpsborg, Norway; Forshaga, and Edsvalla, Sweden

The Pulp and Paper Trading Co.
21 East 40th Street New York City

DEALERS IN DOMESTIC CHEMICAL AND MECHANICAL PULPS AND PAPER

AGENTS FOR
J. & J. Rogers Company, Ausable Forks, N. Y.
E. B. Eddy Company, Ltd., Hull, Canada

Canadian Kraft Limited, Three Rivers, Canada
Dealers in Wayagamack Kraft Pulp

Howard Smith Paper Mills, Montreal, Quebec
EASTERN AGENTS of Sulphite Pulp. Made by
Port Huron Sulphite & Paper Co., Port Huron, Mich.

SULPHATE OF ALUMINA
MANUFACTURED BY
THE JARECKI CHEMICAL CO.

SODA ASH 58%
MANUFACTURED BY
PITTSBURGH PLATE GLASS CO.
COLUMBIA CHEMICAL DIVISION

The Isaac Winkler & Bro. Co.
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CASEIN

Standard Quality
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Owing to substantial reductions in the cost of all materials entering into the construction of Jenssen Acid Towers, we are now building them at

NORMAL PRICES

Will YOU let us show YOU how to make MONEY by making a

BETTER ACID

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New Sand Filter

A SPECIAL filter for paper mills, producing all the results the paper manufacturer desires. It is a modification of the well known Hungerford filter adapted to paper mill use. It is constructed of concrete, strictly wrought iron pipe, brass strainers and especially prepared silica sand. It is as durable and efficient as can be built at any cost. It can be sold at a very low figure.

This filter gives perfectly clear water, washes thoroughly, does not require renewal of the sand bed, is absolutely reliable in the performance of its duty and requires a minimum amount of attention.

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93 coils from Rotterdam and 65 bls. from Havre; Castel & Overton, 131 bls. from Dunkirk; North German Lloyd, 44 bls. from Bremen; Ellerman-Wilson S. S. Line, 66 coils from London; National City Bank, 58 coils from Antwerp; Anglo-South American Trust Co., 76 coils from Antwerp; W. Schall & Co., 147 bls. from Barcelona; M. Wolfer & Co., 26 bls. from Havana; Order, 16 coils from Christiania, 54 coils from Rotterdam and 34 coils from Swansea.

Old Bagging

E. Butterworth & Co., 110 bls. from Rotterdam; Mechanics & Metals National Bank, 118 bls. from Liverpool; L. H. Abenheimer, 285 bls. from Rotterdam; E. J. Keller Co., 971 bls. from Rotterdam, 521 bls. from Antwerp, 137 bls. from Copenhagen, 129 bls. from Havre and 64 bls. from Hamburg; Stone Bros. & Victor Gallaup Co., 200 bls. from Havre; Brown Bros. & Co., 125 bls. from Newcastle; Guaranty Trust Co., 165 bls. from Antwerp; New York Trust Co., 50 bls. from Antwerp; S. Birkenstein & Sons, 112 bls. from London; Chase National Bank, 36 bls. from Antwerp; Equitable Trust Co., 57 bls. from Manchester; Prince & Kennedy, 102 bls. from Dublin; State Bank, 216 bls. from London; Order, 81 bls. from Antwerp, 89 bls. from Liverpool and 57 bls. from Dublin.

Rags

Daniel M. Hicks, Inc., 724 bls. from Rotterdam; Katzenstein & Keene, 192 bls. from St. Nazaire, 147 bls. from Havre and 85 bls. from Leith; Waste Material Trading Corp., 61 bls. from Hamburg and 126 bls. from Hull; E. J. Keller Co., 1,092 bls. from Hamburg, 677 bls. from Bremen, 3,276 bls. from Rotterdam, 1,821 bls. from Antwerp, 133 bls. from Catania, 320 bls. from Copenhagen, 374 bls. from Bordeaux and 104 bls. from Algiers; Stone Bros. & Victor Gallaup Co., 579 bls. from Havre and 120 bls. from Naples; G. M. Graves Co., 33 bls. from Leith and 67 bls. from Glasgow; P. Berlowitz, 219 bls. from Rotterdam; Robert Blank, 146 bls. from Havre and 297 bls. from Rotterdam; Strupp & Co., 116 bls. from Bremen; Arrowhead Mills, 158 bls. from Antwerp; M. Wolfer & Co., 32 bls. from Havana; Leshner Paper Stock Co., 111 bls. from London; L. H. Abenheimer, 160 bls. from Barcelona; Ignazio, Abela & Co., 112 bls. from Trieste; Maurice O'Meara Co., 194 bls. from Buenos Aires; Union National Bank of Philadelphia, 44 bls. from Hamburg; Manufacturers Trust Co., 18 bls. from London; Baring Bros. & Co., 60 bls. from Glasgow; A. H. Searle, 230 bls. from Glasgow; R. F. Downing & Co., 68 bls. from Manchester; Bankers Trust Co., 197 bls. from Antwerp; Coal & Iron National Bank, 49 bls. from Antwerp, 104 bls. from Dublin and 100 bls. from Glasgow; National Union Bank of Boston, 108 bls. from Antwerp; Bank of New York & Trust Co., 48 bls. from Barcelona; Irving Bank-Columbia Trust Co., 106 bls. from Buenos Aires; First National Bank of Boston, 29 bls. from Antwerp; Philadelphia National Bank, 160 bls. from Newcastle and 104 bls. from Belfast; New York Trust Co., 179 bls. from Newcastle and 88 bls. from London; American Express Co., 860 bls. from Bristol; Goldman, Sachs & Co., 376 bls. from Rotterdam, 84 bls. from Bremen, 358 bls. from Antwerp, 41 bls. from Bordeaux and 250 bls. from Havre; Brown Bros. & Co., 1,261 bls. from Antwerp and 56 bls. from Glasgow; Kidder, Peabody Acceptance Corp., 134 bls. from Antwerp, 230 bls. from Rotterdam and 40 bls. from Hamburg; State Bank, 37 bls. from Antwerp, 574 bls. from Rotterdam and 184 bls. from Glasgow; Ladenburg, Thalman & Co., 348 bls. from Rotterdam; A. W. Fenton, Inc., 317 bls. from Havre and 54 bls. from Rotterdam; North German Lloyd, 220 bls. from Bremen; Globe Shipping Co., 44 bls. from Hamburg; C. R. Spence & Co., 17 bls. from Newcastle, 155 bls. from Dublin and 24 bls. from Glasgow; E. Butterworth & Co., 155 bls. from Rotterdam; Salomon Bros. & Co., 141 bls. from Hamburg; Castle & Overton, 98 bls. from Belfast; C. G. Keferstein, 80 bls. from Rotterdam; Mechanics & Metals National Bank, 174 bls. from Rotterdam; Equitable Trust Co., 464 bls. from Rotterdam, 32 bls. from Antwerp, 35 bls. from Havre, 810 bls. from Barcelona and 81 bls. from Hamburg; American Exchange National Bank, 205 bls. from Hamburg and 34 bls. from Bremen; Anglo-South American Trust Co., 247 bls. from Antwerp and 26 bls. from Manchester; Chemical National Bank, 46 bls. from Rotterdam, 285 bls. from Bremen and 143 bls. from Hamburg; International Acceptance Bank, 303 bls. from London, 765 bls. from Rotterdam, 131 bls. from Havre, 210 bls. from Newcastle and 35 bls. from Antwerp; Guaranty Trust Co., 678 bls. from Antwerp, 193 bls. from Rotterdam, 32 bls. from Palermo, 614 bls. from Bremen, 171 bls. from Manchester, 24 bls. from Belfast, 630 bls. from Havre, 8 bls. from Hamburg and 97 bls. from Bristol; National City Bank, 42 bls. from Rotterdam and 362 bls. from Antwerp; Chase

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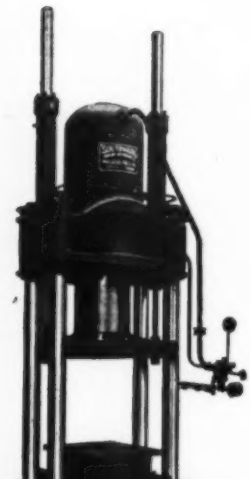
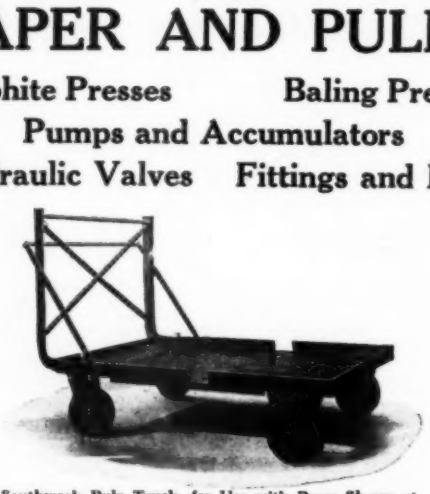


600 Ton Pulp Press



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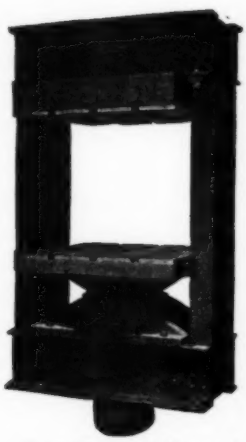

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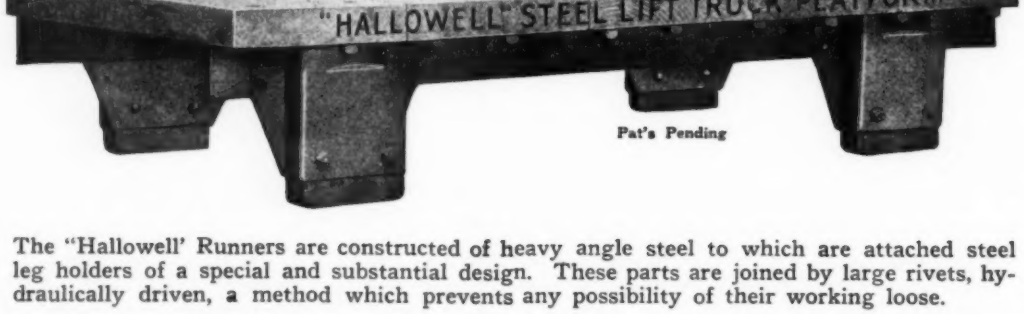
"HALLOWELL" Steel Lift Truck Platform



Pat's Pending

The "Hallowell' Runners are constructed of heavy angle steel to which are attached steel leg holders of a special and substantial design. These parts are joined by large rivets, hydraulically driven, a method which prevents any possibility of their working loose.

This detail of construction is of vast importance as unless the legs are rigidly and permanently attached to the runners they will gradually become wobbly and unreliable, occasionally collapsing.

The "Hallowell" joints remain tight—they cannot do otherwise.
This and other features, along with its low initial cost, combine to make the "Hallowell" a very interesting proposition.

Manufactured by

Standard Pressed Steel Co., Jenkintown, Pa.

The "Pioneer" Steel Hanger people

National Bank, 98 bls. from Rotterdam, 114 bls. from Bremen, 61 bls. from Antwerp and 38 bls. from Marseilles; Order, 374 bls. from Hamburg, 227 bls. from London, 387 bls. from Liverpool, 462 bls. from Bremen, 18 bls. from Havre, 106 bls. from Antwerp, 218 bls. from Bordeaux, 120 bls. from Buenos Aires, 140 bls. from Manchester, 144 bls. from Glasgow and 503 bls. from Barcelona.

Miscellaneous Paper Stock

Equitable Trust Co., 41 bls. from Dunkirk and 96 bls. from Antwerp; Daniel M. Hicks, Inc., 99 bls. from Dunkirk; E. J. Keller Co., 83 bls. from Dunkirk, 107 bls. from Bremen, 140 bls. from Antwerp, 212 bls. from Rotterdam and 179 bls. from Hamburg; C. B. Richard & Co., 52 bls. from Rotterdam; Maurice O'Meara Co., 22 bls. from Dundee and 32 bls. from Rotterdam; Salomon Bros. & Co., 23 bls. from Dunkirk; International Acceptance Bank, 107 bls. from Antwerp; Brown Bros. & Co., 109 bls. from Dublin; International Forwarding Co., 100 bls. from Hamburg; Katzenstein & Keene, 301 bls. from Barcelona; Order, 244 bls. from Antwerp, 191 bls. from Dundee, 51 bls. from Rotterdam, 90 bls. from Belfast, 86 bls. from Barcelona and 63 bls. from Leith.

Paper

Imports of wrapping paper into the United States during March were fairly large, judging from arrivals through the port of New York. Shipments of this class of paper continued to originate principally in Germany and the Scandinavian countries. There were also some good-sized lots of cigarette and news print paper received, while arrivals of filter, hanging, drawing and other papers were about normal. Imports of paper of all kinds through the port of New York in March follow:

Cigarette

P. J. Schweitzer, 65 cs. and 24 bls.; Standard products Corp., 464 cs.; Surbrug Co., 17 cs.; F. P. Gaskell & Co., 76 cs.; American Tobacco Co., 800 cs.; De Manduit Paper Corp., 339 cs.; R. J. Reynolds Tobacco Co., 1,060 cs.; M. Spiegel & Sons, 27 cs.; J. Confino & Co., 5 cs.; Zorro Tobacco Co., 12 cs.; Order, 56 cs.

Printing

International Acceptance Bank, 1,260 rolls; Andrews Co., 54 bls.; W. Hartman & Co., 191 rolls; Chemical National Bank, 403 rolls; C. G. Keferstein, 660 rolls; Steffens, John & Co., 17 cs.; B. F. Drakenfeld & Co., 51 cs.; E. Naumberg & Co., 485 rolls; Johaneson, Wales & Sparre, 55 rolls; Martin & Bechtold, 20 cs.; C. Steiner, 74 cs. and 88 bls.; National City Bank, 796 rolls; J. H. Scott Paper Co., 334 rolls; Traders Paper Co., 681 rolls; Miller & Wright Paper Co., 4 cs.; Perkins-Goodwin Co., 109 cs. and 217 rolls; Perry, Ryer & Co., 90 cs.; P. C. Zuhlke, 195 cs.; T. D. Downing & Co., 16 rolls; M. Gottesman & Co., 63 rolls; Leonhard, Moritz & Co., 66 rolls; American Express Co., 412 bls.; Parsons & Whittemore, 921 rolls; Hudson Trading Co., 30 rolls; American Exchange National Bank, 98 rolls; J. P. Heffernan Paper Co., 13 bls.; P. Puttmann, 11 cs.; Order, 627 rolls and 9 cs.

Wrapping

Republic Bag & Paper Co., 10,262 rolls and 1,473 bls.; J. P. Heffernan Paper Co., 368 bls.; Wilkinson Bros. & Co., 94 rolls and 469 bls.; Import Paper Co., 9 bls.; Birn & Wachenheim, 29 cs.; Publicity Paper Corp., 348 bls.; Blauvelt-Wiley Paper Mfg. Co., 273 bls.; Bernard, Judae & Co., 15 bls.; Gibson Bros., 314 rolls; A. M. Capens' Sons, 25 bls.; C. K. MacAlpine & Co., 415 rolls and 51 bls.; Kircheimer Bros., 47 rolls; Baxter Paper Co., 38 bls.; D. S. Walton & Co., 4,533 rolls; H. Reeve Angel & Co., 832 rolls and 2 cs.; Corn Exchange National Bank, 90 cs.; Chase National Bank, 960 rolls and 121 bls.; W. Hartmann & Co., 118 rolls and 28 bls.; F. C. Strype, 30 cs.; Mechanics & Metals National Bank, 449 rolls; A. E. McAdam & Co., 599 rolls and 37 bls.; Brooklyn Standard Bag Co., 455 rolls; Arkell Safety Bag Co., 290 rolls and 23 bls.; Borregaard Co., 400 bls.; Hyman & Schultz, 132 rolls; Melby, Kuttroff & Co., 28 rolls; Maurice O'Meara Co., 16 bls.; New York Trust Co., 575 bls.; International Acceptance Bank, 900 pkgs.; British-American Tobacco Co., 70 rolls; Order, 208 bls. and 1,157 rolls.

Writing

Erstein & Co., 10 cs.; Goubont, Freres & Co., 51 cs.; M. Ward, Inc., 6 cs.; Globe Shipping Co., 4 cs.; Draeger Shipping Co., 100 cs.; Order, 7 cs.

Drawing

E. Dietzgen & Co., 54 cs.; Favor, Ruhl & Co., 7 cs.; H.

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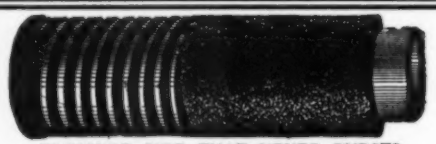

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Built in sizes 1 inch to 48 inches

WYCKOFF WOOD PIPE

The Paper Industry is successfully using thousands of feet of this Pipe and they find it to be the best conveyance for Paper Stock and Acids that can be obtained.

Write today for catalog and prices

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Western Paper Makers Chemical Company

Paper Makers Chemical Company

Kalamazoo, Mich. Holyoke, Mass. Easton, Pa.
Jacksonville, Fla. Pensacola, Fla. St. Austell, England

Rosin Size, Satin White, Clays, Fillers
Foam Killer, Felt Soap and Other Specialties

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THE CHAMPION COATED PAPER CO.
DAILY CAPACITY 850 TONS
HAMILTON, OHIO

March 24, 1924

Trimbey Machine Works,
Glens Falls, N.Y.

Gentlemen:

Enclosed we are pleased to send you our formal order for eight additional Consistency Regulators which we will thank you to ship as soon as possible, same to be installed on the balance of our eight (8) Fourdrinier Paper machines.

The results we are now obtaining on the Regulator which you recently installed on our No. 1 Paper machine are such that we wish to accomplish the installation of these Regulators on the balance of our machines as quickly as possible.

We have been able to effect a very desired improvement in controlling weight, as well as consistency of stock, before it goes on the paper machine.

In your acknowledgement of our order, state definitely when we may expect delivery.

Yours very truly,

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THE CHAMPION COATED PAPER CO.

VICE PRES. & TREAS.

WHAT OHIO THINKS OF THE

Trimbey Automatic Consistency Regulator

Is Shown by Their Orders Since January 1st, 1924

9—Champion Coated Paper Co.
2—W. B. Oglesby Paper Co.
3—Paul A. Sorg Paper Co.
1—Frank A. Smith Paper Co.
1—Hagar Straw Board and Paper Co.
1—Beckett Paper Co.

More than 275 now in use in the United States, Canada, Norway, Sweden, Finland, Holland, Japan, England and Switzerland.

Also "MADE IN CANADA"

TRIMBEY MACHINE WORKS

GLENS FALLS, NEW YORK

Reeve Angel & Co., 4 cs.; Keuffel & Esser Co., 29 rolls and 39 cs.; Order, 3 cs.

Filter

H. Reeve Angel & Co., 22 cs.; G. & H. Transport Co., 12 cs.

Tissue

F. C. Strype, 13 cs.; Order, 4 cs.

Photo

Altek Photographic Co., 27 cs.; Gevaert Co. of America, 64 cs.; Globe Shipping Co., 332 cs.; T. F. Wilmot & Co., 2 cs.; J. J. Gavin & Co., 5 cs.; P. C. Zuhlke, 141 cs.

Hanging

A. C. Dodman, Jr., & Co., 29 bls. and 10 cs.; F. J. Emmerich & Co., 53 bls.; W. H. S. Lloyd & Co., 317 bls.; Guaranty Trust Co., 10 bls.; National City Bank, 481 bls. and 516 rolls; R. F. Downing & Co., 8 bls.; Federal Commission Co., 2 bls.; F. G. Prager & Co., 276 bls.; Order, 5 cs. and 28 bls.

Board

P. H. Petry & Co., 9 cs.; Eastern Calendar Co., 16 cs.; Wilkinson Bros. & Co., 131 bls. and 42 rolls; Metropolitan Import & Mfg. Co., 105 cs.; Adrian Vuyck, 250 rolls; O. G. Hempstead & Sons, 12 cs.; Friedman & Co., 9 cs.; Bendix Paper Co., 23 cs.; Premier Shipping Co., 81 cs.; A. H. Ringk & Co., 25 cs.; Pulp and Paper Trading Co., 116 rolls; Harriet Hubbard Ayer, 3 cs.; Sefton Mfg. Co., 84 rolls; Alpers & Mott, 57 cs.; Flexideal Co., 70 cs.; J. P. Heffernan Paper Co., 10 bls.

Miscellaneous

Steiner Paper Co., 46 cs. and 16 bls.; J. J. Frank, 25 cs.; Dupont Cellophane Co., 27 cs.; Coenca-Morrison Co., 12 cs.; Thomas & Pierson, 7 cs.; Whiting-Patterson Co., 38 cs.; P. H. Petry & Co., 34 cs.; W. Van Doorn, 8 cs. and 22 bls.; C. W. Williams & Co., 81 cs.; Baldwin Shipping Co., 6 cs.; Kolesch Co., 12 cs.; A. Frankan & Co., 8 cs.; R. F. Downing & Co., 24 cs.; Japan Paper Co., 55 cs.; Louis De Jonge & Co., 27 cs.; American Express Co., 7 cs.; Herman Lips, 22 cs.; LeCurto & Funk, 32 bls.; Albermarle Paper Mfg. Co., 34 bls.; H. D. Catty & Co., 5 cs.; Southern Pacific Co., 3 cs.

Foreign Trade Opportunities

Additional information regarding the following foreign trade opportunities issued by the Bureau of Foreign and Domestic Commerce of the United States Department of Commerce may be obtained from the Bureau in Washington, D. C., or its branch offices. It is requested that the number of the inquiry be given at all times.

No. 9617—Old newspapers. Hong Kong, China. Purchase desired.

No. 9628—Paper for office supplies, sanitary drinking cups and towels, and toilet paper. Panama City, Panama Republic. Purchase desired.

No. 9584—Jute waste. Vancouver, Canada. Purchase desired.

No. 9596—Rosin. Copenhagen, Denmark. Purchase desired.

No. 9708—Fiber, vulcan, black and red, in plates and sticks. Vienna, Austria. Agency desired.

No. 9698—Paper in boxes, pads, and paper bags. Rio Piedras, Porto Rico. Agency desired.

No. 9662—Caustic soda, 50 tons. Vienna, Austria. Purchase desired.

Improvements at P. H. Glatfelter Mills

Work has been nearly completed on the installation of motors in the beater room of the P. H. Glatfelter Company, at Spring Grove, Pa. The triple-expansion Fitchburg engine which has been in continuous service since 1887 will no longer be used. The beaters will be driven by motors, transmitting power by means of Lennix drives. Three new Jones Jordan engines have been installed.

Eight new dryers have been added to the 100-inch paper machine, which has resulted in increased production.

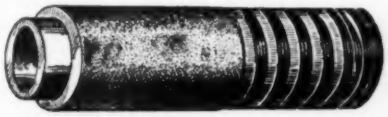
In February a new 1000 hp. Edgemoor boiler was put into service. The boiler is equipped with Taylor stokers and Sturtevant economizer, the draft being induced.

A new 84-inch Seybold cutter has been added to the finishing department.

All five machines are now equipped with Bird screens, the smallest machine having just been furnished with a Bird screen and suction roll.

Standard Wood Pipe

"The Pipe that Stands the Test"



More Durable and Economical

Used extensively by the Paper Industry for conveying paper stock and acids. Especially adapted for conveying sulphite and ground wood.

Has greater carrying capacity than iron pipe, costs less to install and much less liable to freeze than any other type pipe.

Write for catalogue and prices

Standard Wood Pipe Co.

Williamsport, Penna., U. S. A.

A. D. COOK, Inc.

Lawrenceburg **Indiana**

FIG. NO. 50

Manufacturers of Deep Well Pumps, Working Barrels, Rods, Foot Valves, Strainers and a full line of Water Well Supplies.

The accompanying half tone shows the COOK Patent Brass Tube Well Strainer with Standard Fittings, which are Bail Plug in the bottom and Foot of Blank and Lead Packer on top.

When the COOK Strainer is properly selected for the water bearing sand, capacity and method of pumping, it will successfully deliver the maximum yield of the well for many years free from sand and the troubles incident thereto.

Write for Bulletin 30A

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Machine and English Finish Book Papers

Offset. Special Papers for Coating

Special Papers for Wall Paper Manufacturers

Capacity 35,000 Tons Per Year

PATTEN PAPER CO., Ltd.

Manufacturers of

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Mills at

Appleton and Kaukauna, Wisconsin

Office: Appleton, Wisconsin

The Dorr Save-All*

By M. C. FLEMING

The Dorr Company, New York City

THE problem of reclaiming stock from water discharged to waste from pulp and paper mills is one of increasing interest in the industry. The equipment described herein is one which offers an efficient means of recovery by sedimentation method at a negligible operating cost, and is the result of wide experience in clarification and reclaiming operations and careful consideration of conditions in paper mills.

Figures from various sources on investigations made which consists of measuring the flow of wasted white water and its analysis for the stock content show that the quantity of stock lost at this point is often several times that supposed by the mill operators. That this stock has a definite recovery value is certainly true as a number of mills are recovering it and returning it to the process so that it is made into paper. A fair value to place on it is that of the raw material as fed to the beaters, although the recovered stock may actually be returned to the paper machine or stock chest.

Let us assume this stock has only a value equal to that of the raw material and on this basis the stock lost is worth $35 per day. Its recovery by any method which costs but a few cents for its daily operation should be a matter of vital interest from the standpoint of economics alone, to say nothing of the satisfaction of having increased technical efficiency and decrease in shrinkage. As a matter of fact the above figure is a low average and the loss in some mills probably runs twice this amount or more. All of this lost stock can be settled and recovered by sedimentation methods.

There are three conditions that equipment for recovery work should meet, in order to be satisfactory in paper mills. First, limited floor space in and around paper mills; second, that necessary head room and pumping should be kept at a minimum; third, it should operate with little or not attention and repairs or replacement of parts should be almost entirely obviated. The Dorr Save-all was developed with these conditions in mind.

For the separation of any solids in a liquid by continuous settling, it is necessary to decrease the rate of flow to such an extent that the solids can drop out or sedimentation take place. The Dorr Save-all uses a central feed and peripheral overflow or oulet arrangement for the clarified water, and it will be apparent from this arrangement that the maximum reduction in the rate of flow is obtained. The decrease in the rate of flow is in turn, of course, dependent on the settling area available. The settling capacity or clarification capacity of shallow tanks is approximately the same as comparatively deeper ones. The Dorr Save-all, while primarily a single tank, is so arranged that it can be considered as a number of shallow settling tanks or compartments one above the other, each with a peripheral outlet arrangement but with a common central feed. There is also a common outlet in the center of the bottom compartment for the slurry containing the recovered stock. Each settling compartment has a slightly sloping bottom and is equipped with slowly rotating arms to which ploughs are attached that collect and move the settled stock to the center. The collecting arms are carried on a central shaft which is operated by a mechanism located above the water level in the machine.

Each compartment is equipped with manholes and on account of the slightly sloping bottom, washing out when changing colors is quickly accomplished. Special squeegees attached to the ploughs keep each compartment thoroughly clean and prevent any accumulation of stock.

A 1-horsepower motor is more than sufficient for power requirements and no attention is needed other than a daily oiling. A feature that is of particular interest is that repairs or replacing of parts is almost entirely eliminated. As yet there has not been an opportunity to get definite information in this connection, but machines very similar in design have been operating in other industries for several years without any replacement of parts whatever.

In operation so far the recovered stock is returned to the mixing box of the paper machine by a small centrifugal pump. This slurry, however, could probably be as readily returned to the beaters or to the stock chest. The location of the Save-all at a point whereby the white water can flow to it by gravity from the paper machine permits the best operating arrangement. A 1½-inch centrifugal pump returning the recovered stock requires about ¾-horsepower for elevating 10 feet above the top of the Save-all. In the event that it is more convenient to locate the Save-all on the same floor as the paper machine, a 4-inch centrifugal to elevate the white water 12 feet to it would not require more than 4-horsepower. This is not excessive and to partially compensate for it and the larger pump the recovered stock would flow by gravity back to the mixing box or the beaters and the small centrifugal pump would not be necessary.

In returning the recovered stock to the operation it might appear that the stock which had once gone through the Fourdrinier wires would do so again. If this were true there would be a continual increase in the feed to the Save-all. It has been found by making analysis of the stock in the waste white water before starting the Save-all and at various intervals after it had been started, that no apparent increase from the return of the recovered stock takes place. It is apparent, therefore, that this recovered stock when returned anywhere in the operations ahead of the paper machine has the same chance of being incorporated in the finished paper as any other stock.

Some operating data on one of these machines, which is the average of several months' operation, is as follows:

Table No. 1

	Pounds Stock 1,000 Gals.	% Stock
Feed to Save-all	10.0	.12
Clarified effluent to waste	.32	.004
Return to mixing box		Approx. 1%

Table No. 2

	Gals., Min.	Gals., 24 Hours	Pounds Stock, 24 Hours
Feed to Save-all	165	238,000	2,380
Clarified effluent	145	209,000	67
Return to operation	20	29,000	2,313

Efficiency, 97%.

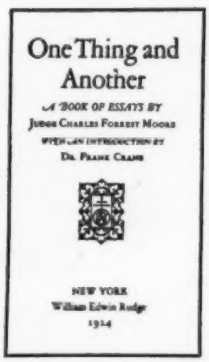
The capacity of the machines from data so far obtained is approximately as follows:

10 feet diameter	240,000 gallons per 24 hours
12 feet diameter	320,000 gallons per 24 hours
15 feet diameter	500,000 gallons per 24 hours
18 feet diameter	750,000 gallons per 24 hours
24 feet diameter	1,300,000 gallons per 24 hours

These capacities will vary somewhat, according to the settling qualities of the stock and the amount of stock in the white water.

*Address on Technical Association Program of the Second Paper Industries Exposition, April 10, 1924, at the Grand Central Palace, New York City.

Have you bought one?



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Every house where money is earned from the paper industry should have a place for the Judge's Book.

For we who get our living from "paper," who work in it, live in the atmosphere of it and love it, too, owe more than we can ever pay to Judge Moore for his work in our industry.

He has done a lot for us. Will you do this for him?

Send for one copy at least of Judge Moore's Book, mailing a check or money order for $10 and the filled-in coupon.

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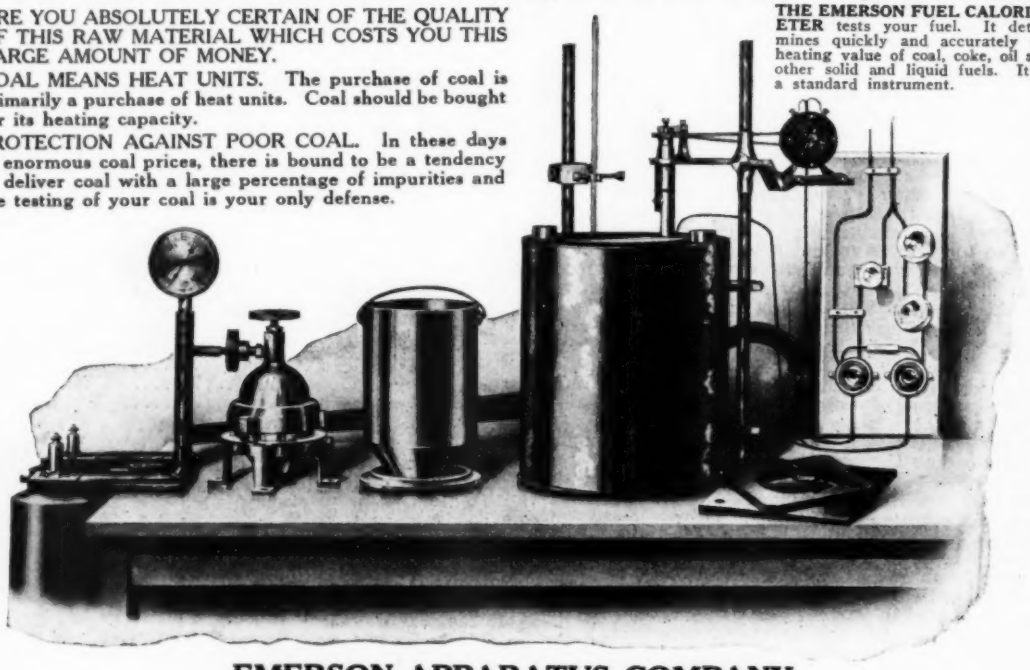

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